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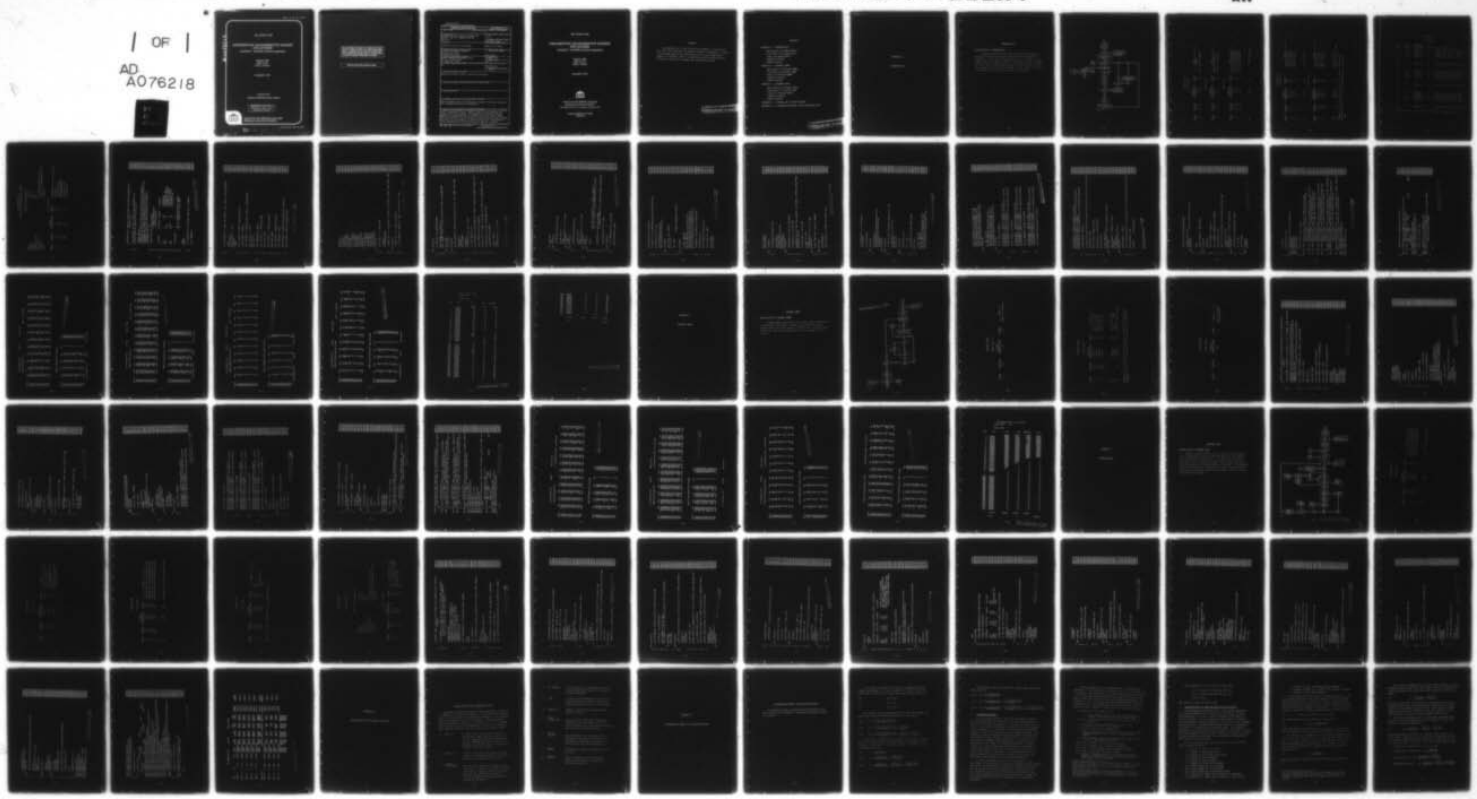

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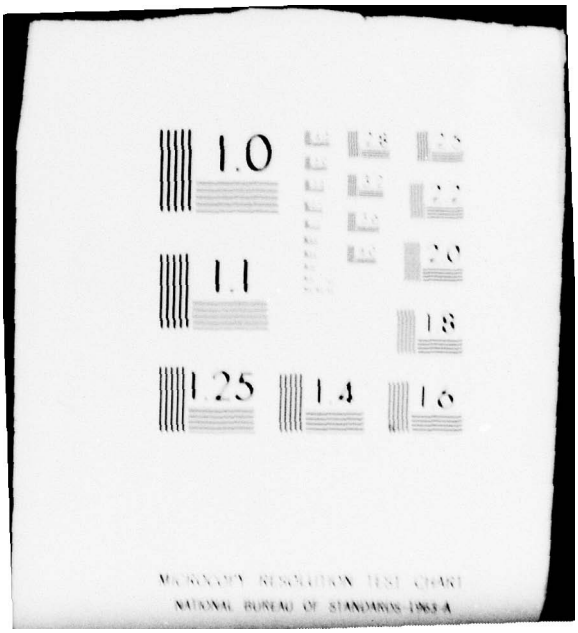
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IDA STUDY S-504

IMPLEMENTING USAGE-SENSITIVE CHARGES FOR AUTODIN

VOLUME II: AUTODIN Technical Appendices

James P. Bell
John N. Fry
Dale L. Moody

November 1978

Prepared for

Defense Communications Agency

INSTITUTE FOR DEFENSE ANALYSES
PROGRAM ANALYSIS DIVISION

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20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

A technique is developed for accumulating and processing data on AUTODIN digital communication usage, applying usage rates and computing user charges for billing purposes. The program was activated on Defense Commercial Communications Office computers and tested using a special 1978 sample of actual system traffic and several alternate rate structures. Resulting cost distributions are shown and discussed. The problems of system implementation and interpretation of data are discussed.

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PREFACE

The appendices in this volume are intended to provide the user with the technical information needed to reproduce or modify the programs used in the analysis and to process additional samples of AUTODIN traffic or additional cost allocations with different connectivity charges and utilization rates.

CONTENTS

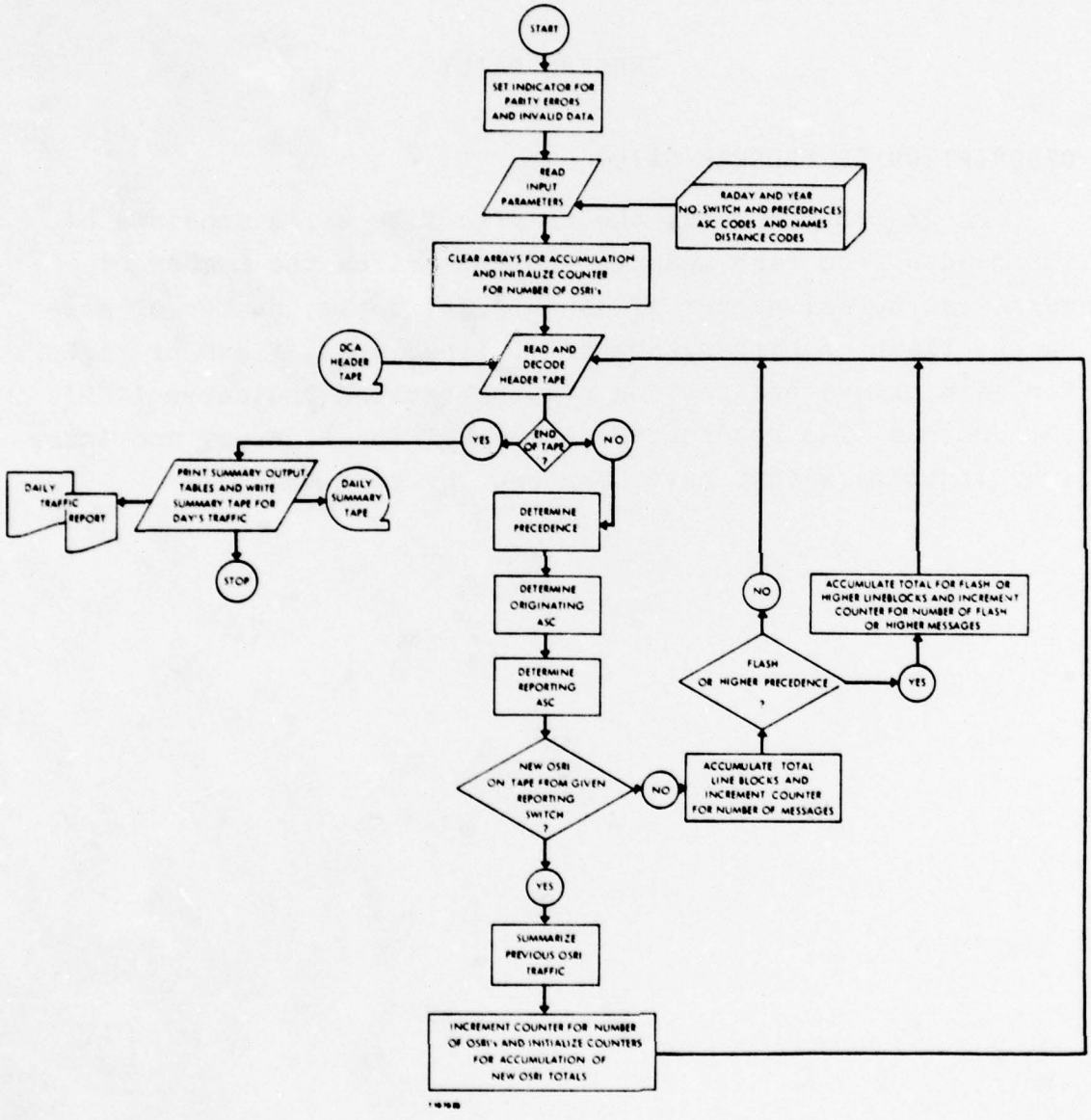
APPENDIX A

PROGRAM DAILY

PROGRAM DAILY

DESCRIPTION OF PROGRAM DAILY

Program DAILY reads the traffic file which consists of the header from each message and summarizes the number of messages, total; number of lineblocks, total; number of messages, flash or higher; number of lineblocks, flash or higher. For each unique originating station routing indicator (OSRI) the program also records the number of local, area, and inter-area lineblocks that have been sent by that OSRI.


START
SET INDICATOR FOR PARITY ERRORS AND INVALID DATA
READ INPUT PARAMETERS
RADAY AND YEAR NO. SWITCH AND PRECEDENCES ASC CODES AND NAMES DISTANCE CODES
CLEAR ARRAYS FOR ACCUMULATION AND INITIALIZE COUNTER FOR NUMBER OF OSRI's
DCA HEADER TAPE
READ AND DECODE HEADER TAPE
END OF TAPE ?
YES
NO
DAILY TRAFFIC REPORT
PRINT SUMMARY OUTPUT TABLES AND WRITE SUMMARY TAPE FOR DAY'S TRAFFIC
DAILY SUMMARY TAPE
STOP
DETERMINE PRECEDENCE
DETERMINE ORIGINATING ASC
DETERMINE REPORTING ASC
NEW OSRI ON TAPE FROM GIVEN REPORTING SWITCH ?
NO
YES
ACCUMULATE TOTAL LINE BLOCKS AND INCREMENT COUNTER FOR NUMBER OF MESSAGES
FLASH OR HIGHER PRECEDENCE ?
NO
YES
ACCUMULATE TOTAL FOR FLASH OR HIGHER LINEBLOCKS AND INCREMENT COUNTER FOR NUMBER OF FLASH OR HIGHER MESSAGES
SUMMARIZE PREVIOUS OSRI TRAFFIC
INCREMENT COUNTER FOR NUMBER OF OSRI's AND INITIALIZE COUNTERS FOR ACCUMULATION OF NEW OSRI TOTALS

PROGRAM DAILY

INPUT CARD 1

Field	Position	FORTRAN Variable Name	Format	Item
1	1 - 5	NRD	I5	RADAY
2	6 - 10	NYR	I5	Year (Last two digits)

INPUT CARD 2

Field	Position	FORTRAN Variable Name	Format	Item
1	1 - 5	N1	I5	Number of switches
2	6 - 10	NP	I5	Number of precedences

INPUT CARD 3

Field	Position	FORTRAN Variable Name	Format	Item
1	1 - 10	PP(1)	A1	Code for 1st Precedence
2	11 - 20	PP(2)	A1	Code for 2nd Precedence
3	21 - 30	PP(3)	A1	Code for 3rd Precedence
4	31 - 40	PP(4)	A1	Code for 4th Precedence
.	.		.	.
.	.		.	.
.	.		.	.
NP		PP(NP)	A1	NP^{th} Precedence

PROGRAM DAILY

INPUT CARD 4

Field	Position	FORTRAN Variable Name	Format	Item
	1	ASC (1)	A1	Code for 1st ASC
2	2	ASC (2)	A1	Code for 2nd ASC
3	3	ASC (3)	A1	Code for 3rd ASC
4	4	ASC (4)	A1	Code for 4th ASC
.	.	.	.	.
.	.	.	.	.
.	.	.	.	.
N1		ASC (N1)	A1	Code for n1th ASC

INPUT CARD 5

Field	Position	FORTRAN Variable Name	Format	Item
1	1-4	ASCN (1)	A4	Name of 1st ASC
2	5-8	ASCN (2)	A4	Name of 2nd ASC
3	9-12	ASCN (3)	A4	Name of 3rd ASC
4	13-16	ASCN (4)	A4	Name of 4th ASC
.	.	.	.	.
.	.	.	.	.
.	.	.	.	.
N1		ASCN (N1)	A4	Name of N1th ASC
N2	*	ASCN (N3)	A4	Label for total column

*Maximum of 20 elements per card, may be continued on another card.

#ASC N2 is ASC N1 + 1 to account for any mis-coded or invalid ASC codes

PROGRAM DAILY

INPUT CARD 6

Field	Position	FORTRAN Variable Name	Format	Item
1	1-4	KDIST(1,1)	I4	Distance Code for ASC 1 to ASC 1
2	5-8	KDIST(1,2)	I4	Distance Code for ASC 1 to ASC 2
3	9-12	KDIST(1,3)	I4	Distance Code for ASC 1 to ASC 3
4	13-16	KDIST(1,4)	I4	Distance Code for ASC 1 to ASC 4
.	.	.	.	
.	.	.	.	
.	.	.	.	
N2[1]	*	KDIST(1,N2)	I4	Distance Code for ASC 1 to ASC N2
.				
.				
.				
1	1-4	KDIST(2,1)	I4	Distance Code for ASC 2 to ASC 1
2	5-8	KDIST(2,2)	I4	Distance Code for ASC 2 to ASC 2
3	9-12	KDIST(2,3)	I4	Distance Code for ASC 2 to ASC 3
4	13-16	KDIST(2,4)	I4	Distance Code for ASC 2 to ASC 4
.				
.				
.				
N2	*	KDIST(2,N2)	I4	Distance Code for ASC 2 to ASC N2
.				
.				
.				
1	1-4	KDIST(N2,1)	I4	Distance Code for ASC N2 to ASC 1
2	5-8	KDIST(N2,2)	I4	Distance Code for ASC N2 to ASC 2
3	9-12	KDIST(N2,3)	I4	Distance Code for ASC N2 to ASC 3
4	13-16	KDIST(N2,4)	I4	Distance Code for ASC N2 to ASC 4
.	.	.		
.	.	.		
.	.	.		
N2	*	KDIST(N2,N2)		Distance Code for ASC N2 to ASC N2

[1]ASC N2 is ASC N1 + 1 to account for any mis-coded or invalid ASC codes.

PROGRAM DAILY

INPUT TRAFFIC FILE--HEADER EXTRACT

PHYSICAL CHARACTERISTICS

Tape:	7 track
Density:	800 bsi
Parity:	Even
Character Code:	BCD
Record Size:	90 Characters/logical record
Blocking:	8 logical records/physical block
Label:	Unlabeled

LOGICAL RECORD

Field	Position	FORTRAN Variable Name	Format	Item
1	1	P	A1	Precedence
2	5	SWO	A1	Originating ASR
3	8-14	OSRI	A7	Originating station routing indicator
4	19-21	LB	I3	Line-block count
5	76	SWR	A1	Reporting ASC

```
      PROGRAM DAILY(INPUT,OUTPUT,TAPE1=1,TAPE2=2,TAPE5=INPUT,                1000010
     X              TAPE6=OUTPUT)                                            1000020
C                                                                            1000030
C     THIS PROGRAM READS, UNPACKS, AND SUMMARIES DCA                         1000040
C     HEADER EXTRACTS TAPES FOR A GIVEN DAY                                  1000050
C                                                                            1000060
      COMMON BUF(200)                                                        1000070
      DIMENSION NM(17,17),NLB(17,17),NFM(17,17),NFLB(17,17)                  1000080
      DIMENSION NMT(18,18),NLBT(18,18),NFMT(18,18),NFLBT(18,18)              1000090
      DIMENSION PP(6),ASC(17),ASCN(18),KDIST(17,17)                          1000100
      DIMENSION KUM(3),TRK(5000),KSUM(5000,3),KTSUM(3)                       1000110
      DIMENSION LINE(30)                                                     1000120
C                                                                            1000130
C     FORMAT FOR THE HEADER TAPES                                            1000140
C                    90 CHARACTERS/RECORD                                    1000150
C                     8 RECORDS/BLOCK                                        1000160
C                                                                            1000170
C     VARIABLE       POSITION  FORMAT     CONTENTS                         1000180
C                                                                            1000190
C     P              1         A1         PRECEDENCE                       1000200
C     SWO            5         A1         ORIGINATING ASC                  1000210
C     OSRI           8-14      A7         ORIGINATING STATION              1000220
C                                         ROUTING INDICATOR                1000230
C     LB             19-21     I3         LINE BLOCK COUNT                 1000240
C     SWR            76        A1         REPORTING ASC                    1000250
C                                                                            1000260
C     INITIALIZE                                                             1000270
C                    NPE -- NUMBER OF PARITY ERRORS                          1000280
C                    NBR -- NUMBER OF BLOCKS READ                            1000290
C                                                                            1000300
      NPE=0                                                                  1000310
      NBR=0                                                                  1000320
C                                                                            1000330
C     SET INDICATORS TO IGNORE TAPE PARITY ERRORS                            1000340
C                                                                            1000350
      CALL NOPCHK(5)                                                         1000360
```

```
C                                                                       1000370
C     SET INDICATOR TO SKIP ANY RECORD WITH INVALID DATA ELEMENTS       1000380
C                                                                       1000390
      IGO=1                                                             1000400
      CALL INCK(0)                                                      1000410
      GO TO (1,1000), IGO                                               1000420
    1 CONTINUE                                                          1000430
      IGO=2                                                             1000440
C                                                                       1000450
C     READ RADAY AND YEAR (LAST TWO DIGITS)                             1000460
C                                                                       1000470
      READ(5,7001) NRD,NYR                                              1000480
C                                                                       1000490
C     READ NUMBER OF SWITCHES AND NUMBER OF PRECEDENCES                 1000500
C                                                                       1000510
      READ (5,7001) N1,NP                                               1000520
      N2 = N1 + 1                                                       1000530
      N3 = N1 + 2                                                       1000540
C                                                                       1000550
C     READ PRECEDENCE CODES                                             1000560
C                                                                       1000570
      READ (5,7002)  (PP(K),K=1,NP)                                     1000580
C                                                                       1000590
C     READ ASC CODES                                                    1000600
C                                                                       1000610
      READ (5,7002)  (ASC(K),K=1,N1)                                    1000620
C                                                                       1000630
C     READ ASC NAMES                                                    1000640
C                                                                       1000650
      READ (5,7003) (ASCN(K),K=1,N3)                                    1000660
C                                                                       1000670
C     READ DISTANCE CODE                                                1000680
C                                                                       1000690
      READ(5,7004) ((KDIST(K1,K2),K2=1,N2),K1=1,N2)                     1000700
C                                                                       1000710
C     CLEAR ARRAYS USED FOR ACCUMULATION                                1000720
```

```
C                                                                       1000730
      NTORI=0                                                           1000740
      DO 5 K=1,3                                                        1000750
      KUM(K)=0                                                          1000760
      KTSUM(K)=0                                                        1000770
      DO 5 J=1,5000                                                     1000780
      KSUM(J,K)=0                                                       1000790
    5 CONTINUE                                                          1000800
      DO 10 K1=1,N2                                                     1000810
      DO 10 K2=1,N2                                                     1000820
      NM(K1,K2)=0                                                       1000830
      NLB(K1,K2)=0                                                      1000840
      NPM(K1,K2)=0                                                      1000850
      NPLB(K1,K2)=0                                                     1000860
   10 CONTINUE                                                          1000870
      DO 20 K1=1,N2                                                     1000880
      DO 20 K2=1,N2                                                     1000890
      NMT(K1,K2)=0                                                      1000900
      NLBT(K1,K2)=0                                                     1000910
      NPMT(K1,K2)=0                                                     1000920
      NPLBT(K1,K2)=0                                                    1000930
   20 CONTINUE                                                          1000940
C                                                                       1000950
C     SET FORI TO A DUMMY USRI                                          1000960
C                                                                       1000970
      KFIRST=1                                                          1000980
      FORI=7H*******                                                    1000990
C                                                                       1001000
C     BUFFER IN ALLOWS PROGRAM TO READ ONE ENTIRE RECORD FROM INPUT TAPE 1001010
C                                                                       1001020
  100 CONTINUE                                                          1001030
C                                                                       1001040
      BUFFER IN (1,0) (BUF(1),BUF(72))                                  1001050
C                                                                       1001060
C     UNIT STATEMENT CHECKS TO SEE IF BUFFER IN IS DONE                 1001070
C                                                                       1001080
```

```
  120 CONTINUE                                                          1001090
C                                                                       1001100
      IF(UNIT,1) 130,140,3000,2000                                      1001110
C                                                                       1001120
C     WHEN BUFFER IS NOT DONE                                           1001130
C     XRCL ALLOWS OTHER IN QUEUE TO EXECUTE FOR 9 MILLISECONDS          1001140
C                                                                       1001150
  130 CALL XRCL                                                         1001160
      GO TO 120                                                         1001170
C                                                                       1001180
  140 CONTINUE                                                          1001190
C                                                                       1001200
C     LENGTH FUNCTION RETURNS (IS THE VALUE OF) THE NUMBER JUST READ    1001210
C                                                                       1001220
      L=LENGTH(1)                                                       1001230
      L1=10*L                                                           1001240
      L1= L1/90*90                                                      1001250
C                                                                       1001260
      NBR=NBR+1                                                         1001270
      IF(NBR.GT.3000) GO TO 3000                                        1001280
C                                                                       1001290
      DO 1000 IS=1,L1,90                                                1001300
C                                                                       1001310
C     MCHAR MOVES 90 CHARACTERS AT A TIME TO ANOTHER ARRAY CALLED LINE  1001320
C                                                                       1001330
      CALL MCHAR(IS,BUF,1,LINE,90)                                      1001340
C                                                                       1001350
C     DECODE IS EQUIVALENT TO A READ STATEMENT FOR UNBLOCKED DATA       1001360
C                                                                       1001370
      DECODE(90,7000,LINE) P,SWU,ORT,LR,SWR                             1001380
C                                                                       1001390
C     DETERMINE PRECEDENCE                                              1001400
C                                                                       1001410
      DO 210 K=1,NP                                                     1001420
      KP=K                                                              1001430
      IF(P.EQ.PP(K)) GO TO 220                                          1001440
```

```
  210 CONTINUE                                                          1001450
      K2=1                                                              1001460
  220 CONTINUE                                                          1001470
C                                                                       1001480
C     DETERMINE ORIGINATING ASC                                         1001490
C                                                                       1001500
      DO 230 K=1,N1                                                     1001510
      K1=K                                                              1001520
      IF(SWO.EQ.ASC(K)) GO TO 240                                       1001530
  230 CONTINUE                                                          1001540
      K1=N2                                                             1001550
  240 CONTINUE                                                          1001560
C                                                                       1001570
C     DETERMINE REPORTING ASC                                           1001580
C                                                                       1001590
      DO 250 K=1,N1                                                     1001600
      K2=K                                                              1001610
      IF(SWR.EQ.ASC(K)) GO TO 260                                       1001620
  250 CONTINUE                                                          1001630
      K2=N2                                                             1001640
  260 CONTINUE                                                          1001650
C                                                                       1001660
C     NOTE:                                                             1001670
C                     THE ABOVE STATEMENT WILL SET AN INVALID           1001680
C                     ASC TO 17 AND AN INVALID PRECEDENCE TO ROUTINE    1001690
C                                                                       1001700
C     DETERMINE IF ODSI HAS CHANGED                                     1001710
C                     IF CHANGED SUMMARIZE AND WRITE SUMMARY STATISTICS 1001720
C                                                                       1001730
      IF(FORI.NE.ODSI) GO TO 400                                        1001740
C                                                                       1001750
  300 CONTINUE                                                          1001760
C                                                                       1001770
C     COUNT MESSAGES AND LINEBLOCKS                                     1001780
C                                                                       1001790
      NM(K1,K2)=NM(K1,K2)+1                                             1001800
```

```
      NLB(K1,K2)=NLB(K1,K2)+LB                                          1001810
C                                                                       1001820
C     IF FLASH OR HIGH PRECEDENCE ACCUMULATE SUBTOTAL                   1001830
C                                                                       1001840
      IF(KP.LE.3) GO TO 310                                             1001850
C                                                                       1001860
      NFM(K1,K2)=NFM(K1,K2)+1                                           1001870
      NFLB(K1,K2)=NFLB(K1,K2)+LB                                        1001880
C                                                                       1001890
  310 CONTINUE                                                          1001900
C                                                                       1001910
C     READY FOR NEXT HEADER                                             1001920
      GO TO 1000                                                        1001930
C                                                                       1001940
C     NEW ORSI                                                          1001950
C                    SUMMARY AND RECORD RESULTS                         1001960
C                                                                       1001970
  400 CONTINUE                                                          1001980
C                                                                       1001990
      DO 510 J1=1,N2                                                    1002000
      DO 510 J2=1,N2                                                    1002010
      NMT(J1,J2)=NMT(J1,J2)+NM(J1,J2)                                   1002020
      NLBT(J1,J2)=NLBT(J1,J2)+NLB(J1,J2)                                1002030
      NFMT(J1,J2)=NFMT(J1,J2)+NFM(J1,J2)                                1002040
      NFLBT(J1,J2)=NFLBT(J1,J2)+NFLB(J1,J2)                             1002050
C                                                                       1002060
C     DETERMINE DISTANCES AND ACCUMULATE                                1002070
C                                                                       1002080
      KD=KDIST(J1,J2)                                                   1002090
C                                                                       1002100
      KUM(KD)=KUM(KD)+NLB(J1,J2)                                        1002110
C                                                                       1002120
C     CLEAR FOR NEXT ORSI                                               1002130
C                                                                       1002140
      NM(J1,J2)=0                                                       1002150
      NLB(J1,J2)=0                                                      1002160
```

```
      NFM(J1,J2)=0                                                          1002170
      NFLB(J1,J2)=0                                                         1002180
C                                                                           1002190
  510 CONTINUE                                                              1002200
C                                                                           1002210
C     INITIALIZE FOR NEXT OSRI                                              1002220
C                                                                           1002230
      NM(K1,K2)=1                                                           1002240
      NLB(K1,K2)=LB                                                         1002250
      IF(KP.LE.3) GO TO 515                                                 1002260
      NFM(K1,K2)=1                                                          1002270
      NFLB(K1,K2)=LB                                                        1002280
  515 CONTINUE                                                              1002290
C                                                                           1002300
C     SUMMARIZE BY OSRI AND DISTANCE                                        1002310
C                                                                           1002320
      IF(KFIRST.EQ.1) GO TO 550                                             1002330
C                                                                           1002340
C     DETERMINE IF THIS OSRI HAS ALREADY HAD TRAFFIC THROUGH SOME OTHER     1002350
C     REPORTING SWITCH                                                      1002360
C                                                                           1002370
      IF(NTORI.EQ.0) GO TO 525                                              1002380
C                                                                           1002390
      DO 520 J=1,NTORI                                                      1002400
      KORI=J                                                                1002410
      IF(IORI.EQ.TRT(J)) GO TO 530                                          1002420
  520 CONTINUE                                                              1002430
C                                                                           1002440
C     FIRST TIME OSRI HAS HAD TRAFFIC                                       1002450
C                                                                           1002460
  525 CONTINUE                                                              1002470
C                                                                           1002480
      NTORI=NTORI+1                                                         1002490
C                                                                           1002500
C     CHECK LIMITS ON NUMBER OF UNIQUE OSRI                                 1002510
C                                                                           1002520
```

```
      IF(NTORI.GT.5000) NTORI=5000                                      1002530
      KORI=NTORI                                                        1002540
C                                                                       1002550
      THT(KORI)=FORT                                                    1002560
C                                                                       1002570
  530 CONTINUE                                                          1002580
C                                                                       1002590
      DO 540 KD=1,3                                                     1002600
      KSUM(KORI,KD)=KSUM(KORI,KD)+KUM(KD)                               1002610
      KTSUM(KD)=KTSUM(KD)+KUM(KD)                                       1002620
      KUM(KD)=0                                                         1002630
  540 CONTINUE                                                          1002640
C                                                                       1002650
  550 CONTINUE                                                          1002660
C                                                                       1002670
C     IF END OF FILE HAS BEEN FOUND GO TO END                           1002680
C                                                                       1002690
      IF(KFIRST.EQ.3) GO TO 700                                         1002700
      KFIRST = 2                                                        1002710
      FORI = ORI                                                        1002720
C                                                                       1002730
 1000 CONTINUE                                                          1002740
C                                                                       1002750
C     READ NEXT BLOCK                                                   1002760
C                                                                       1002770
      GO TO 100                                                         1002780
C                                                                       1002790
C     CALCULATE TOTALS FOR EACH TABLE                                   1002800
C                                                                       1002810
  700 CONTINUE                                                          1002820
C                                                                       1002830
      DO 710 J1=1,N2                                                    1002840
      DO 710 J2=1,N2                                                    1002850
      NMT(N3,J2)=NMT(N3,J2)+NMT(J1,J2)                                  1002860
      NMT(J1,N3)=NMT(J1,N3)+NMT(J1,J2)                                  1002870
      NLBT(N3,J2)=NLBT(N3,J2)+NLBT(J1,J2)                               1002880
```

```
      NLBT(J1,N3)=NLBT(J1,N3)+NLBT(J1,J2)                                1002890
      NFMT(N3,J2)=NFMT(N3,J2)+NFMT(J1,J2)                                1002900
      NFMT(J1,N3)=NFMT(J1,N3)+NFMT(J1,J2)                                1002910
      NFLBT(N3,J2)=NFLBT(N3,J2)+NFLBT(J1,J2)                             1002920
      NFLBT(J1,N3)=NFLBT(J1,N3)+NFLBT(J1,J2)                             1002930
  710 CONTINUE                                                           1002940
C                                                                        1002950
      DO 720 J1=1,N2                                                     1002960
      NMT(N3,N3)=NMT(N3,N3)+NMT(J1,N3)                                   1002970
      NLBT(N3,N3)=NLBT(N3,N3)+NLBT(J1,N3)                                1002980
      NFMT(N3,N3)=NFMT(N3,N3)+NFMT(J1,N3)                                1002990
      NFLBT(N3,N3)=NFLBT(N3,N3)+NFLBT(J1,N3)                             1003000
  720 CONTINUE                                                           1003010
C                                                                        1003020
C     PRINT TOTAL MESSAGES                                               1003030
C                                                                        1003040
      WRITE(6,8002)  NRD,NYR,(ASCN(J),I=1,12)                            1003050
      WRITE(6,8010)(ASCN(J1),(NMT(J1,J2),J2=1,12),J1=1,N3)               1003060
      WRITE(6,8003)(ASCN(J),J=13,N2)                                     1003070
      WRITE(6,8011)(ASCN(J1),(NMT(J1,J2),J2=13,N3),J1=1,N3)              1003080
C                                                                        1003090
C     PRINT TOTAL LINE BLOCKS                                            1003100
C                                                                        1003110
      WRITE(6,8004)  NRD,NYR,(ASCN(J),J=1,12)                            1003120
      WRITE(6,8010)(ASCN(J1),(NLBT(J1,J2),J2=1,12),J1=1,N3)              1003130
      WRITE(6,8003)(ASCN(J),J=13,N2)                                     1003140
      WRITE(6,8011)(ASCN(J1),(NLBT(J1,J2),J2=13,N3),J1=1,N3)             1003150
C                                                                        1003160
C     PRINT MESSAGES--FLASH OR HIGHER                                    1003170
C                                                                        1003180
      WRITE(6,8006)  NRD,NYR,(ASCN(J),I=1,12)                            1003190
      WRITE(6,8010)(ASCN(J1),(NFMT(J1,J2),J2=1,12),J1=1,N3)              1003200
      WRITE(6,8007)(ASCN(J),J=13,N2)                                     1003210
      WRITE(6,8011)(ASCN(J1),(NFMT(J1,J2),J2=13,N3),J1=1,N3)             1003220
C                                                                        1003230
C     PRINT LINEBLOCKS--FLASH OR HIGHER                                  1003240
```

```
C                                                                       1003250
      WRITE(6,8008)  NRD,NYR,(ASCN(J),J=1,12)                           1003260
      WRITE(6,8010)(ASCN(J1),(NFLBT(J1,J2),J2=1,12),J1=1,N3)            1003270
      WRITE(6,8009)(ASCN(J),J=13,N2)                                    1003280
      WRITE(6,8011)(ASCN(J1),(NFLBT(J1,J2),J2=13,N3),J1=1,N3)           1003290
C                                                                       1003300
      WRITE(6,9003) NBR,NPE                                             1003310
C                                                                       1003320
C     ------------------------------------------------------------------1003330
C                                                                       1003340
C     TEMPORARY OUTPUT                                                  1003350
C                                                                       1003360
C     PRINT TOTAL NUMBER OF USRI                                        1003370
C                                                                       1003380
      WRITE(6,6001) NRD,NYR,NTORI                                       1003390
C                                                                       1003400
      WRITE(6,6002)                                                     1003410
C                                                                       1003420
      DO 810 J=1,NTORI                                                  1003430
      WRITE(6,6003) J,TRI(J),(KSUM(J,L),L=1,3)                          1003440
  810 CONTINUE                                                          1003450
C                                                                       1003460
      WRITE(6,6004) (KTSUM(L),L=1,3)                                    1003470
      KTOTAL=0                                                          1003480
      DO 830 L=1,3                                                      1003490
      KTOTAL=KTOTAL+KTSUM(L)                                            1003500
  830 CONTINUE                                                          1003510
C                                                                       1003520
      WRITE(6,6005) KTOTAL                                              1003530
C                                                                       1003540
C     ------------------------------------------------------------------1003550
C                                                                       1003560
C     WRITE SUMMARY TAPE                                                1003570
C                                                                       1003580
      WRITE(2)       NRD,NYR,NTORI                                      1003590
C                                                                       1003600
```

```
      WRITE(2) NMT,NLBT,NFMT,NFLBT                                      1003610
C                                                                       1003620
      DO 820 J=1,NTORI                                                  1003630
      WRITE(2)        J,TRI(J),(RSUM(J,L),L=1,3)                        1003640
  820 CONTINUE                                                          1003650
C                                                                       1003660
C                                                                       1003670
      STOP                                                              1003680
C                                                                       1003690
C     PARITY ERROR ON INPUT TAPE                                        1003700
C                                                                       1003710
 2000 CONTINUE                                                          1003720
C                                                                       1003730
      NPE=NPE+1                                                         1003740
C                                                                       1003750
C     WRITE REMARK IN DAYFILE                                           1003760
C                                                                       1003770
      CALL REMARK(17HREAD PARITY ERROR)                                 1003780
C                                                                       1003790
      WRITE(6,9001) NPE                                                 1003800
C                                                                       1003810
C     WRITE OUT ENTIRE BLOCK AND IGNORE BLOCK FOR DATA                  1003820
C                                                                       1003830
      DO 2010 L1=1,72,8                                                 1003840
      L2=L1+7                                                           1003850
      WRITE(6,9002) L1,(BUF(L),L=L1,L2)                                 1003860
 2010 CONTINUE                                                          1003870
C                                                                       1003880
C     CONTINUE WITH READING NEXT BLOCK                                  1003890
C                                                                       1003900
      GO TO 100                                                         1003910
C                                                                       1003920
C     END OF TAPE                                                       1003930
C                                                                       1003940
 3000 CONTINUE                                                          1003950
      KETRST=3                                                          1003960
```

```
      GO TO 400                                                          1003970
C                                                                        1003980
C     FORMATS FOR INPUT                                                  1003990
C                                                                        1004000
 7000 FORMAT(A1,3X,A1,2X,A1,4X,I3,54X,A1)                                1004010
 7001 FORMAT(2I5)                                                        1004020
 7002 FORMAT(20A1)                                                       1004030
 7003 FORMAT(20A4)                                                       1004040
 7004 FORMAT(17I4)                                                       1004050
C                                                                        1004060
C     FORMATS FOR OUTPUT TABLES                                          1004070
C                                                                        1004080
 8002 FORMAT(1H1//20X,26H NUMBER OF MESSAGES--TOTAL,44X,                 1004090
     1       6HRADAY ,I3,11H OF YEAR 19,I2////10H FROM/TO  ,             1004100
     2       12(5X,A4,1X)/)                                              1004110
 8003 FORMAT(/////20X,38H NUMBER OF MESSAGES--TOTAL (CONTINUED),         1004120
     1       ////10H FROM/TO  ,12(5X,A4,1A),9X,5HTOTAL/)                 1004130
 8004 FORMAT(1H1//20X,29H NUMBER OF LINE BLOCKS--TOTAL,41X,              1004140
     1       6HRADAY ,I3,11H OF YEAR 19,I2////10H FROM/TO  ,             1004150
     2       12(5X,A4,1X)/)                                              1004160
 8005 FORMAT(/////20X,41H NUMBER OF LINE BLOCKS--TOTAL (CONTINUED),      1004170
     1       ////10H FROM/TO  ,12(5X,A4,1A),9X,5HTOTAL/)                 1004180
 8006 FORMAT(1H1//20X,36H NUMBER OF MESSAGES--FLASH OR HIGHER,34X,       1004190
     1       6HRADAY ,I3,11H OF YEAR 19,I2////10H FROM/TO  ,             1004200
     2       12(5X,A4,1X)/)                                              1004210
 8007 FORMAT(/////20X,48H NUMBER OF MESSAGES--FLASH OR HIGHER (CONTINUED 1004220
     1),22X, ////10H FROM/TO  ,12(5X,A4,1A),9X,5HTOTAL/)                 1004230
 8008 FORMAT(1H1//20X,39H NUMBER OF LINE BLOCKS--FLASH OR HIGHER,31X,    1004240
     1       6HRADAY ,I3,11H OF YEAR 19,I2////10H FROM/TO  ,             1004250
     2       12(5X,A4,1X)/)                                              1004260
 8009 FORMAT(/////20X,51H NUMBER OF LINE BLOCKS--FLASH OR HIGHER (CONTIN 1004270
     1UED)   ////10H FROM/TO  ,12(5X,A4,1A),9X,5HTOTAL/)                 1004280
 8010 FORMAT(2X,A4,3X,12I10)                                             1004290
 8011 FORMAT(2X,A4,3X,5I10,I15)                                          1004300
 8012 FORMAT(3I10)                                                       1004310
 8014 FORMAT(I10,A7,2I15)                                                1004320
```

```
C                                                                       1004330
C     FORMATS FOR TEMPORARY OUTPUT TABLES                               1004340
C                                                                       1004350
 6001 FORMAT(1H1///2?X,6HRANAY ,I3,11H OF YEAR 19,I2//                  1004360
     1       20X,15HNUMBER OF OSRI ,I10//)                              1004370
 6002 FORMAT(20X,15HTRAFFIC BY ORST///                                  1004380
     1       70H    NUMBER       OSRI                  LOCAL          AREA 1004390
     2    INTER-AREA  //)                                               1004400
 6003 FORMAT(I10,5X,A7,3X,3I15)                                         1004410
 6004 FORMAT(//15X,9HSUB-TOTAL,3X,3I15)                                 1004420
 6005 FORMAT(//15X,5HTOTAL,7X,3I15)                                     1004430
C                                                                       1004440
C     FORMATS FOR SYSTEM DATA                                           1004450
C                                                                       1004460
 9001 FORMAT(18H PARITY ERROR NO. ,I5)                                  1004470
 9002 FORMAT(1X,I10,4X,1H*,9A10,1H*)                                    1004480
 9003 FORMAT(///13H1END OF TAPE,//5X,I5,12H BLOCKS READ//               1004490
     1       5X,I5,14H PARITY ERRORS)                                   1004500
C                                                                       1004510
      END                                                               1004520
```

NUMBER OF MESSAGES--TOTAL RADAY 8 OF YEAR 1978

FROM/TO	RUEA	RUCL	RUMM	RUEO	RUDO	RUMJ	RUCI	RUED	RUAD	RJWW	RJWJ	RJFT
RUEA	12380	1072	171	v97	868	179	475	532	486	529	433	561
RUCL	1332	2269	110	v17	222	130	452	837	153	288	545	345
RUMM	52	83	2426	172	113	466	15	67	308	139	207	17
RUEO	1308	1313	298	4/14	983	123	766	886	616	947	560	549
RUDO	2127	105	41	219	3985	50	61	150	81	72	68	932
RUMJ	125	13	383	114	16	1418	18	36	199	96	149	17
RUCI	661	940	87	678	230	78	1425	919	170	388	877	205
RUED	438	552	92	766	244	107	536	1340	93	467	302	289
RUAD	557	13	310	94	6	133	12	19	2566	90	84	3
RUWW	514	592	174	938	97	229	429	271	235	3526	1131	54
RUWJ	640	820	245	716	108	567	542	339	311	901	1966	255
RUFT	1879	386	10	941	1719	27	106	157	21	89	115	3099
RUFL	445	130	11	1470	651	2	49	139	13	32	48	513
RUAK	42	7	32	94	2	3	15	18	193	16	63	3
RUWT	609	685	245	v54	329	162	547	1094	212	933	712	505
RUMM	445	148	1084	735	59	753	78	240	1038	865	593	53
XXXX	0	2	0	2	0	8	0	2	7	0	2	0
TOT	23548	9130	5719	13021	v632	4427	5525	7045	6702	9378	8155	7489

NUMBER OF MESSAGES--TOTAL (CONTINUED)

FROM/TO	RUFL	RUAK	RUWT	RUMM	XXXX	TOTAL
RUEA	235	86	450	418	0	19872
RUCL	321	35	449	137	0	8642
RUMM	7	56	157	403	0	4688
RUEO	1484	191	773	921	0	16239
RUDO	865	0	121	20	0	8797
RUMJ	6	22	35	340	0	2987
RUCI	332	54	457	141	0	7642
RUED	332	197	327	104	0	6177
RUAD	9	87	99	651	0	4739
RUWW	168	111	737	799	0	9905
RUWJ	192	57	604	854	0	9114
RUFT	2447	4	147	28	0	10675
RUFL	3700	0	66	18	0	7087
RUAK	2	1194	21	168	0	1873
RUWT	511	87	1814	642	0	9636
RUMM	82	149	278	2357	0	9054
XXXX	0	0	0	1	0	14
TOT	10693	2330	4535	7202	0	137132

NUMBER OF LINE BLOCKS--TOTAL RADAY 8 OF YEAR 1978

FROM/TO	RUEB	RUCL	RUMM	RUEO	RUDO	RUMJ	RUCI	RUED	RUAD	RUWM	RJWJ	RJFT
RUEB	3A9679	37152	4322	48703	39010	5200	56441	57075	19771	24077	19914	19122
RUCL	91568	90381	2091	26039	8894	2740	12342	22821	3202	5785	19246	8562
RUMM	1138	3952	21642	5060	5371	18324	337	2505	9115	1731	6213	705
RUEO	97004	52320	11916	289350	33232	3598	62448	85559	20865	33213	22385	22740
RUDO	78446	3275	1821	9935	66863	1419	2187	1469	3282	1577	1398	25007
RUMJ	3817	699	9210	6932	767	17233	485	685	4643	2223	2541	501
RUCI	21688	44833	1478	28097	10493	4952	63303	39794	7545	11298	77562	11702
RUED	32423	24247	3531	20795	12583	3542	52060	129959	2578	19293	36961	32961
RUAD	19586	644	18511	4742	341	9411	568	511	30776	2188	1471	141
RUWM	12064	34543	5367	49768	6379	6269	17006	18209	7088	115395	64899	1151
RUWJ	22503	38009	7429	28031	8965	39655	84749	183a9	9773	30387	77565	18627
RUFT	91026	9159	210	19139	48730	291	4867	6515	563	1690	7335	94982
RUFL	12147	3916	353	38913	28054	18	2756	5178	588	949	1775	18749
RUAK	1375	205	1576	3264	70	44	456	1105	6379	417	23793	81
RUWT	37324	33975	9699	42305	13470	4009	59031	76170	5457	91711	35578	36185
RUHH	9341	4192	31769	19240	1125	22090	2128	7742	70411	21225	17750	1989
XXXX	0	41	0	6	0	0	0	6	28	0	41	0
TOT	740251	381543	122925	619219	267347	119795	421164	473611	198065	363160	396527	251993

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NUMBER OF LINE BLOCKS--TOTAL (CONTINUED)

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FROM/TO	RUFL	RUAK	RUWT	RUHH	XXXX	TOTAL
RUEB	6564	2380	14716	14011	0	752637
RUCL	7806	472	7214	1965	0	245128
RUMM	109	1100	21746	8220	0	77860
RUEO	44839	8052	27454	19010	0	774787
RUDO	23914	0	1755	3822	0	218270
RUMJ	289	757	635	7899	0	54117
RUCI	8531	1277	21167	16514	0	370135
RUED	13519	4831	6083	4693	0	408559
RUAD	179	2332	6902	16041	0	97464
RUWM	3968	3891	22373	16231	0	360800
RUWJ	8362	6336	38700	24806	0	431105
RUFT	47357	177	22775	4629	0	275048
RUFL	75891	0	1502	892	0	175672
RUAK	26	21834	1641	5656	0	67522
RUWT	24456	2244	124437	8371	0	607123
RUHH	1218	8260	5465	43511	0	266357
XXXX	0	0	0	3	0	128
TOT	287028	63943	278065	178074	0	5182719

NUMBER OF MESSAGES--FLASH OR HIGHER RADAY 8 OF YEAR 1978

FROM/TO	RUER	RUCL	RUMM	RUEO	RUDO	RUMJ	RUCI	RUED	RUAD	RUWW	RUWJ	RUFT
RUER	15	1	0	4	5	0	4	6	0	7	0	2
RUCL	29	48	15	31	20	16	22	20	15	23	35	21
RUMM	0	0	55	2	0	70	0	2	49	10	22	0
RUEO	53	56	27	50	49	32	43	49	34	47	43	25
RUDO	12	2	0	2	47	0	6	13	0	0	0	42
RUMJ	0	0	5	1	0	6	0	0	9	2	3	0
RUCI	9	13	3	2	6	0	16	16	3	10	10	0
RUED	13	4	0	1	6	0	11	7	0	14	3	0
RUAD	0	0	0	3	0	0	0	0	22	0	0	0
RUWW	10	0	0	1	0	0	8	17	0	11	0	2
RUWJ	0	10	0	5	1	0	0	0	2	0	3	4
RUFT	0	15	0	3	1	0	0	0	0	0	3	17
RUPL	0	1	0	4	17	0	0	0	0	0	0	57
RUAK	0	0	0	2	0	0	0	0	9	0	0	0
RUHT	0	14	0	6	0	0	0	3	0	0	5	6
RUHH	30	33	42	19	30	36	24	30	51	40	35	29
XXXX	0	0	0	0	0	0	0	0	0	0	0	0
TOT	171	197	147	136	181	160	134	154	194	198	162	197

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NUMBER OF MESSAGES--FLASH OR HIGHER (CONTINUED)

FROM/TO	RUPL	RUAK	RUHT	RUHH	XXXX	TOTAL
RUER	1	0	0	0	0	45
RUCL	14	6	47	27	0	389
RUMM	0	13	7	42	0	289
RUEO	27	11	81	39	0	649
RUDO	42	0	0	0	0	175
RUMJ	0	1	0	8	0	34
RUCI	3	0	5	3	0	108
RUED	0	0	0	0	0	59
RUAD	0	6	1	6	0	38
RUWW	3	0	1	0	0	61
RUWJ	0	0	6	5	0	37
RUFT	12	0	3	4	0	58
RUPL	75	0	0	0	0	154
RUAK	0	16	0	4	0	31
RUHT	0	0	3	4	0	41
RUHH	19	15	57	52	0	533
XXXX	0	0	0	0	0	0
TOT	196	68	211	195	0	2693

NUMBER OF LINE BLOCKS--FLASH OR HIGHER RADAY 8 OF YEAR 1978

FROM/TO	RUEA	RUCL	RUMM	RUEO	RUDO	RUMJ	RUCI	RUED	RUAD	RUMM	RJWJ	RUFT
RUEA	82	6	0	42	39	0	34	40	0	47	0	15
RUCL	181	342	105	260	140	112	149	120	105	138	235	142
RUMM	0	0	345	36	0	446	0	36	292	90	110	0
RUEO	363	355	189	835	280	424	284	240	238	282	256	175
RUDO	90	24	0	24	395	0	36	76	0	60	0	522
RUMJ	0	0	32	5	0	36	0	0	56	10	15	0
RUCI	73	138	26	18	52	0	158	175	26	146	97	0
RUED	92	44	0	11	49	0	98	54	0	114	33	0
RUAD	0	0	0	51	0	0	0	0	244	0	0	0
RUMM	64	0	0	7	58	0	49	101	0	62	0	15
RUMJ	0	56	0	28	9	0	0	0	12	0	21	24
RUFT	0	91	0	24	13	0	0	0	0	0	24	165
RUFL	0	3	0	31	218	0	0	0	0	0	0	680
RUAK	0	0	0	32	0	0	0	0	155	0	0	0
RUWT	0	81	0	31	0	0	0	22	0	0	31	41
RUHH	140	160	497	92	170	205	112	140	512	189	169	117
XXXX	0	0	0	0	0	0	0	0	0	0	0	0
TOT	1085	1300	1194	1127	1423	1023	920	1004	1640	1137	990	1901

NUMBER OF LINE BLOCKS--FLASH OR HIGHER (CONTINUED)

FROM/TO	RUFL	RUAK	RUWT	RUHH	XXXX	TOTAL
RUEA	8	0	0	0	0	314
RUCL	98	42	283	160	0	2612
RUMM	0	78	35	236	0	1704
RUEO	188	77	483	232	0	4304
RUDO	514	0	0	0	0	1741
RUMJ	0	6	0	40	0	208
RUCI	26	0	41	23	0	990
RUED	0	0	0	0	0	495
RUAD	0	108	19	102	0	524
RUMM	24	0	5	0	0	386
RUMJ	0	0	35	34	0	219
RUFT	139	0	24	28	0	507
RUFL	849	0	0	0	0	1781
RUAK	0	242	0	64	0	493
RUWT	0	0	23	27	0	256
RUHH	108	210	270	305	0	3394
XXXX	0	0	0	0	0	0
TOT	1953	763	1218	1451	0	19929

RAUAY 3 OF YEAR 1978

NUMBER OF OSRI 1404

TRAFFIC BY OSRI

NUMBER	OSRI	LOCAL	AREA	INTER-AREA
1		251350	191703	315142
2	RAYWCXA	969	0	0
3	RCCACAA	127	0	0
4	RCCBNAA	32	0	0
5	RCCEHAA	18	0	0
6	RCCMCAA	14	0	0
7	RCCPNHA	19	0	0
8	RCCPOGA	28	0	0
9	RCCPUCX	14	0	0
10	RCCPYIA	33	75	0
11	RCFCBAA	11	0	0
12	RGFGHCA	9	0	0
13	RHDDAAA	241	0	0
14	RHFBALO	35	0	0
15	RHFBCSA	4	0	0
16	RHFGGDP	20	0	0
17	RHFGGTN	14	0	0
18	RHFGIUU	5	0	0
19	RHFBDRU	27	0	0
20	RHFBPNH	29	0	
21	RHFGSNM	27	0	
22	RHFGSNH	11	[illegible]	
23	RHFGUCF	10		0
24	RHFRAAA	1618		13
25	RHFRAAH	1708		6
26	RHFXAAA	92[illegible]	0	0
27	RHMOGOA		0	56
28	RUAGAAA		3	0
29	RUCBDFA		0	0
30	RUCHSGG	0	198	0
		0	8	0
		0	13	0
1360	[illegible]	16	8	0
1361	RUHGWQU	8	0	0
1362	RUHGYSJ	4	0	0
1363	RUHHAIA	5	0	0
1364	RUHHBNA	345	0	0
1365	RUHHCIM	198	0	0
1366	RUHHFTA	32	0	0
1367	RUHHNDA	16	0	0
1368	RUHPAYS	0	0	6
1369	RUHPFNM	0	0	17
1370	RUHPFOT	0	0	24
1371	RUHPFXJ	0	0	13
1372	RUHPGIA	13	0	0
1373	RUHPHPV	0	0	11
1374	RUHPKMZ	9	0	0
1375	RUHPLVA	0	0	4
1376	RUHPMRZ	0	56	0
1377	RUHPRPQ	0	0	10
1378	RUHPRUC	0	0	34
1379	RUHPSUU	9	0	0
1380	RUHQHQA	0	16	0
1381	RUWNASU	0	0	85
1382	RUWNAUZ	0	0	103
1383	RUWNBNM	0	0	5
1384	RUWNDCH	0	0	11
1385	RUWNDLM	0	0	99
1386	RUWNECG	0	0	36
1387	RUWNFMC	0	0	76
⋮	⋮	⋮	⋮	⋮

138A	RUWNFMR			
1389	RUWNGEJ	0	0	62
138A	RUWNHLL	0	0	8
1391	RUWNHQM	0	0	10
1392	RUWNTJA	0	0	21
1393	RUWNJSO	0	0	16
1394	RUWNLXZ	0	0	42
1395	RUWNOYF	0	0	0
1396	RUWNRNC	0	0	15
1397	RUWNTWF	0	0	154
1398	RUWNULQ	0	0	55
1399	RUWNUTN	0	0	132
1400	RUWNWMF	0	0	34
1401	RUWNXOS	0	0	44
1402	RUWNZKI	0	0	22
1403	RUWOCSA	0	0	59
1404	RUYNSOJ	0	0	7
			M12	0
	SUB-TOTAL	1413101	23383VA	1171218
	TOTAL			5192715

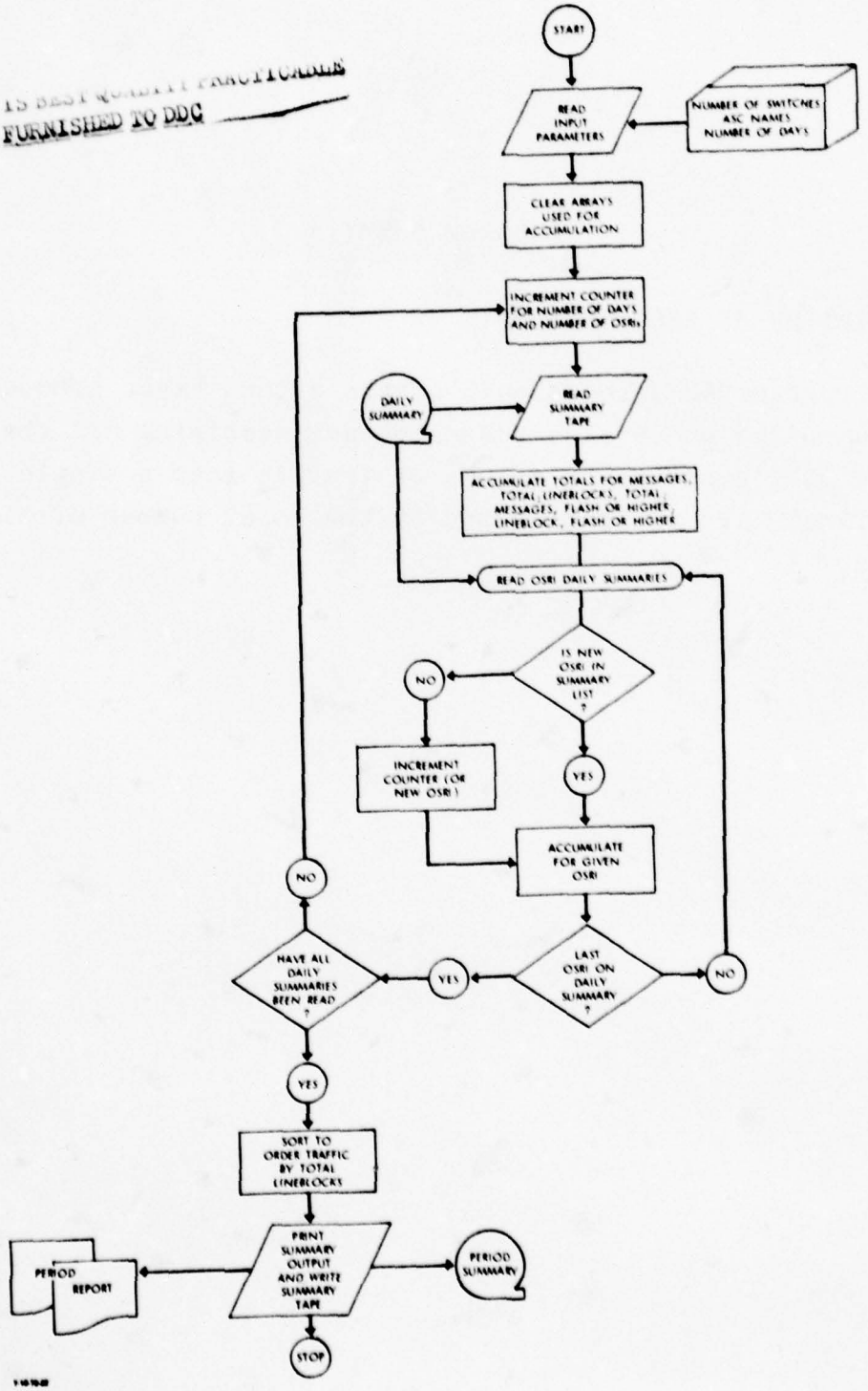
APPENDIX B

PROGRAM SUMMY

PROGRAM SUMMY

DESCRIPTION OF PROGRAM SUMMY

Program SUMMY reads each of the output tapes produced by Program DAILY and writes a single tape combining all the unique OSRI's and their volume of traffic into a single list. This final list is then sorted by the total number of line-blocks.



PROGRAM SUMMY

INPUT CARD 1

Field	Position	FORTRAN Variable Name	Format	Item
1	1-5	N1	I5	Number of switches

PROGRAM SUMMY

INPUT CARD 2

Field	Position	FORTRAN Variable Name	Format	Item
1	1-4	ASCN(1)	A4	Name of 1st ASC
2	5-8	ASCN(2)	A4	Name of 2nd ASC
3	9-12	ASCN(3)	A4	Name of 3rd ASC
4	13-16	ASCN(4)	A4	Name of 4th ASC
.	.	.	.	.
.	.	.	.	.
.	.	.	.	.
N1		ASCN(N1)	A4	Name of N1th ASC
N2		ASCN(N2)	A4	Dummy ASC**
N3	*	ASCN(N3)	A4	Label for total column

*Maximum of 20 elements per card, may be continued on another card.

**ASC N2 is ASC N1 + 1 to account for any mis-coded or invalid ASC codes.

PROGRAM SUMMY

INPUT CARD 3

Field	Position	FORTRAN Variable Name	Format	Item
1	1-5	NDAY	I5	Number of days to be summarized

```
      PROGRAM SUMMY(INPUT,OUTPUT,TAPE2=2,TAPE5=INPUT,TAPE6=OUTPUT,          2000010
     X              TAPE1=1)                                                2000020
C                                                                           2000030
C     THIS PROGRAM SUMMARIES ANY NUMBER OF DAILY SUMMARY TAPES INTO ONE     2000040
C                                                                           2000050
      DIMENSION NM(18,18),NLB(18,18),NFM(18,18),NFLB(18,18)                 2000060
      DIMENSION NMT(18,18),NLBT(18,18),NFMT(18,18),NFLBT(18,18)             2000070
      DIMENSION ASCN(18)                                                    2000080
      DIMENSION KUM(3),TRI(4000),KSUM(4000,4),KTSUM(3),JEMP(4)              2000090
C                                                                           2000100
C     READ NUMBER OF SWITCHES AND NUMBER OF PRECEDENCES                     2000110
C                                                                           2000120
      READ (5,7001) N1,NP                                                   2000130
C                                                                           2000140
      N2 = N1 + 1                                                           2000150
      N3 = N1 + 2                                                           2000160
C                                                                           2000170
C     READ ASC NAMES                                                        2000180
C                                                                           2000190
      READ (5,7003) (ASCN(K),K=1,N3)                                        2000200
C                                                                           2000210
C     READ NUMBER OF DAYS TO BE SUMMARIZED                                  2000220
C                                                                           2000230
      READ (5,7001) NDAY                                                    2000240
C                                                                           2000250
C     CLEAR ARRAYS USED FOR ACCUMULATION                                    2000260
C                                                                           2000270
      DO 5 K=1,3                                                            2000280
      KTSUM(K)=0                                                            2000290
      DO 5 J=1,7500                                                         2000300
      KSUM(J,K)=0                                                           2000310
    5 CONTINUE                                                              2000320
      DO 20 K1=1,N3                                                         2000330
      DO 20 K2=1,N3                                                         2000340
      NMT(K1,K2)=0                                                          2000350
      NLBT(K1,K2)=0                                                         2000360
```

```
      NFMT(K1,K2)=0                                                    2000370
      NLBT(K1,K2)=0                                                    2000380
      NFMT(K1,K2)=0                                                    2000390
      NFLBT(K1,K2)=0                                                   2000400
   20 CONTINUE                                                         2000410
C                                                                      2000420
      KDAY=0                                                           2000430
      NIORI=0                                                          2000440
C                                                                      2000450
  100 CONTINUE                                                         2000460
C                                                                      2000470
      REWIND 2                                                         2000480
C                                                                      2000490
      KDAY=KDAY+1                                                      2000500
C                                                                      2000510
C     READ  SUMMARY TAPE                                               2000520
C                                                                      2000530
      READ (2)       NPD,NYR,NORI                                      2000540
C                                                                      2000550
      READ (2) NM,NLB,NFM,NFLB                                         2000560
C                                                                      2000570
      DO 105 J1=1,N3                                                   2000580
      DO 105 J2=1,N3                                                   2000590
      NMT(J1,J2)=NMT(J1,J2)+NM(J1,J2)                                  2000600
      NLBT(J1,J2)=NLBT(J1,J2)+NLB(J1,J2)                               2000610
      NFMT(J1,J2)=NFMT(J1,J2)+NFM(J1,J2)                               2000620
      NFLBT(J1,J2)=NFLBT(J1,J2)+NFLB(J1,J2)                            2000630
  105 CONTINUE                                                         2000640
C                                                                      2000650
      DO 200 J=1,NORI                                                  2000660
C                                                                      2000670
      READ (2) K,NORI,(KUM(L),L=1,3)                                   2000680
      KCHECK=0                                                         2000690
      DO 107 L=1,3                                                     2000700
      KCHECK=KCHECK+KUM(L)                                             2000710
  107 CONTINUE                                                         2000720
```

```
C
      IF(KCHECK.EQ.0) GO TO 200                                          2000730
C                                                                        2000740
      IF(NTORI.EQ.0) GO TO 120                                           2000750
C                                                                        2000760
      DO 110 K=1,NTORI                                                   2000770
      KRI=K                                                              2000780
      IF(ORI.EQ.TRI(K)) GO TO 130                                        2000790
  110 CONTINUE                                                           2000800
C                                                                        2000810
  120 CONTINUE                                                           2000820
      NTORI=NTORI+1                                                      2000830
      KRI=NTORI                                                          2000840
      TRI(KRI)=ORI                                                       2000850
C                                                                        2000860
  130 CONTINUE                                                           2000870
C                                                                        2000880
      DO 140 L=1,3                                                       2000890
      KSUM(KRI,L)=KSUM(KRI,L)+KUM(L)                                     2000900
  140 CONTINUE                                                           2000910
C                                                                        2000920
  200 CONTINUE                                                           2000930
C                                                                        2000940
      IF(KDAY.EQ.NDAY) GO TO 300                                         2000950
C                                                                        2000960
      REWIND 2                                                           2000970
      CALL MESWAIT(36H*** MOUNT NEXT TAPE AND ENTER GO ***)              2000980
      GO TO 100                                                          2000990
C                                                                        2001000
  300 CONTINUE                                                           2001010
C                                                                        2001020
C     CALCULATE TOTAL TRAFFIC FOR EACH OSRI                              2001030
C                                                                        2001040
      DO 310 J=1,NTORI                                                   2001050
      KSUM(J,4)=0                                                        2001060
      DO 305 KD=1,3                                                      2001070
                                                                         2001080
```

```
      KSUM(J,4)=KSUM(J,4)+KSUM(J,KD)                                    2001090
      KTSUM(KD)=KTSUM(KD)+KSUM(J,KD)                                    2001100
  305 CONTINUE                                                          2001110
  310 CONTINUE                                                          2001120
C                                                                       2001130
C     SORT BY TOTAL TRAFFIC                                             2001140
C                                                                       2001150
      DO 900 I=1,4                                                      2001160
C                                                                       2001170
      DO 350 J=1,NTORI                                                  2001180
      KEMP=0                                                            2001190
      DO 320 K=J,NTORI                                                  2001200
      IF(KEMP.GT.KSUM(K,I)) GO TO 320                                   2001210
      KEMP=KSUM(K,I)                                                    2001220
      JX=K                                                              2001230
  320 CONTINUE                                                          2001240
C                                                                       2001250
      DO 340 L=1,4                                                      2001260
      JEMP(L)=KSUM(J,L)                                                 2001270
      KSUM(J,L)=KSUM(JX,L)                                              2001280
      KSUM(JX,L)=JEMP(L)                                                2001290
  340 CONTINUE                                                          2001300
C                                                                       2001310
      TEMP=TRI(J)                                                       2001320
      TRI(J)=TRI(JX)                                                    2001330
      TRI(JX)=TEMP                                                      2001340
C                                                                       2001350
  350 CONTINUE                                                          2001360
C                                                                       2001370
C     PRINT TOTAL MESSAGES                                              2001380
C                                                                       2001390
      WRITE(6,8002) MDAY,NMO,NYR,(ASCN(J),J=1,12)                       2001400
      WRITE(6,8010)(ASCN(J1),(NMT(J1,J2),J2=1,12),J1=1,N3)              2001410
      WRITE(6,8003)(ASCN(J),J=13,N2)                                    2001420
      WRITE(6,8011)(ASCN(J1),(NMT(J1,J2),J2=13,N3),J1=1,N3)             2001430
C                                                                       2001440
```

```
C       PRINT TOTAL LINE BLOCKS                                          2001450
C                                                                        2001460
        WRITE(6,8004) NDAY,NMO,NYR,(ASCN(J),J=1,12)                      2001470
        WRITE(6,8010)(ASCN(J1),(NLBT(J1,J2),J2=1,12),J1=1,N3)            2001480
        WRITE(6,8005)(ASCN(J),J=13,N2)                                   2001490
        WRITE(6,8011)(ASCN(J1),(NLBT(J1,J2),J2=13,N3),J1=1,N3)           2001500
C                                                                        2001510
C       PRINT MESSAGES--FLASH OR HIGHER                                  2001520
C                                                                        2001530
        WRITE(6,8004) NDAY,NMO,NYR,(ASCN(J),J=1,12)                      2001540
        WRITE(6,8010)(ASCN(J1),(NFMT(J1,J2),J2=1,12),J1=1,N3)            2001550
        WRITE(6,8007)(ASCN(J),J=13,N2)                                   2001560
        WRITE(6,8011)(ASCN(J1),(NFMT(J1,J2),J2=13,N3),J1=1,N3)           2001570
C                                                                        2001580
C       PRINT LINEBLOCKS--FLASH OR HIGHER                                2001590
C                                                                        2001600
        WRITE(6,8008) NDAY,NMO,NYR,(ASCN(J),J=1,12)                      2001610
        WRITE(6,8010)(ASCN(J1),(NFLBT(J1,J2),J2=1,12),J1=1,N3)           2001620
        WRITE(6,8009)(ASCN(J),J=13,N2)                                   2001630
        WRITE(6,8011)(ASCN(J1),(NFLBT(J1,J2),J2=13,N3),J1=1,N3)          2001640
C                                                                        2001650
C       PRINT TOTAL NUMBER OF USAI AND WDIIF SUMMARY OUT                 2001660
C                                                                        2001670
        IF(I.NE.4) GO TO 750                                             2001680
C                                                                        2001690
        REWIND 1                                                         2001700
C                                                                        2001710
        WRITE(1,5001) NDAY,NMO,NYR,NTOAI                                 2001720
C                                                                        2001730
  750 CONTINUE                                                           2001740
C                                                                        2001750
        WRITE(6,6001) NDAY,NMO,NYR,NTOAI                                 2001760
C                                                                        2001770
        WRITE(6,6002)                                                    2001780
C                                                                        2001790
        DO 810 J=1,NTOAI                                                 2001800
```

```
      WRITE(6,6003) J,TRI(J),(KSUM(J,L),L=1,4)                          2001810
C                                                                       2001820
      IF(I.NE.4) GO TO 810                                              2001830
C                                                                       2001840
      WRITE(1,5003) TRI(J),(KSUM(J,L),L=1,4)                            2001850
  810 CONTINUE                                                          2001860
C                                                                       2001870
      WRITE(6,6004) (KTSUM(L),L=1,3)                                    2001880
C                                                                       2001890
      KTOTAL=0                                                          2001900
      DO 830 L=1,3                                                      2001910
      KTOTAL=KTOTAL+KTSUM(L)                                            2001920
  830 CONTINUE                                                          2001930
C                                                                       2001940
      WRITE(6,6005) KTOTAL                                              2001950
C                                                                       2001960
  900 CONTINUE                                                          2001970
C                                                                       2001980
      ENDFILE 1                                                         2001990
C                                                                       2002000
      STOP                                                              2002010
C                                                                       2002020
C     FORMATS FOR INPUT                                                 2002030
C                                                                       2002040
 7001 FORMAT(2I5)                                                       2002050
 7002 FORMAT(20A1)                                                      2002060
 7003 FORMAT(20A4)                                                      2002070
C                                                                       2002080
C     FORMATS FOR OUTPUT TABLES                                         2002090
C                                                                       2002100
 8002 FORMAT(1H1//20X,26H NUMBER OF MESSAGES--TOTAL ,24X,               2002110
     1 I4,24H DAYS ENDING WITH WADAY ,I3,11H OF YEAR 19,I2////10H FROM/T2002120
     X0  ,                                                              2002130
     2       12(5X,A4,1X)/)                                             2002140
 8003 FORMAT(/////20X,38H NUMBER OF MESSAGES--TOTAL (CONTINUED),        2002150
     1       ////10H FROM/TO  ,3(5X,A4,1A),9X,5HTOTAL/)                 2002150
```

```
8004 FORMAT(1H1//20X,29H NUMBER OF LINE BLOCKS--TOTAL,21X,                2002170
     1 I4,24H DAYS ENDING WITH RADAY ,I3,11H OF YEAR 19,I2////10H FROM/T  2002180
     X0  ,                                                               2002190
     2       12(5X,A4,1X)/)                                              2002200
8005 FORMAT(/////20X,41H NUMBER OF LINE BLOCKS--TOTAL (CONTINUED),       2002210
     1       ////10H FROM/10  ,5(5X,A4,1X),9X,5HTOTAL/)                  2002220
8006 FORMAT(1H1//20X,36H NUMBER OF MESSAGES--FLASH OR HIGHER,14X,        2002230
     1 I4,24H DAYS ENDING WITH RADAY ,I3,11H OF YEAR 19,I2////10H FROM/T  2002240
     X0  ,                                                               2002250
     2       12(5X,A4,1X)/)                                              2002260
8007 FORMAT(////20X,48H NUMBER OF MESSAGES--FLASH OR HIGHER (CONTINUED  2002270
     1),22X, ////10H FROM/10  ,5(5X,A4,1X),9X,5HTOTAL/)                  2002280
8008 FORMAT(1H1//20X,39H NUMBER OF LINE BLOCKS--FLASH OR HIGHER,11X,     2002290
     1 I4,24H DAYS ENDING WITH RADAY ,I3,11H OF YEAR 19,I2////10H FROM/T  2002300
     X0  ,                                                               2002310
     2       12(5X,A4,1X)/)                                              2002320
8009 FORMAT(/////20X,51H NUMBER OF LINE BLOCKS--FLASH OR HIGHER (CONTIN  2002330
     1UED)   ////10H FROM/10  ,5(5X,A4,1X),9X,5HTOTAL/)                  2002340
8010 FORMAT(2X,A4,3X,12I10)                                              2002350
8011 FORMAT(2X,A4,3X,5I10,I5)                                            2002360
8012 FORMAT(3I10)                                                        2002370
8014 FORMAT(I10,A7,3I15)                                                 2002380
5001 FORMAT(4I10)                                                        2002390
5002 FORMAT(I10,A7,3I15)                                                 2002400
5003 FORMAT(A7,4I15)                                                     2002410
6001 FORMAT(1H1///20X,I4,24H DAYS ENDING WITH RADAY ,I3,11H OF YEAR 19,  2002420
     X  I2//                                                             2002430
     1       20X,15HNUMBER OF OSRI ,I10///)                              2002440
6002 FORMAT(20X,15HTRAFFIC BY OSRI///                                    2002450
     1       A7H    NUMBER          OSRI                    LOCAL              ARE 2002460
     2A     INTER-AREA            TOTAL//)                              2002470
6003 FORMAT(I10,5X,A7,5X,4I15)                                           2002480
6004 FORMAT(//15X,9HSUB-TOTAL,3X,3I16)                                   2002490
6005 FORMAT(//15X,5HTOTAL,52X,I15)                                       2002500
C                                                                        2002510
      END                                                                2002520
```

NUMBER OF MESSAGES--TOTAL 7 DAYS ENDING WITH RADAY 10 OF YEAR 1978

FROM/TO	RUEB	RUCL	RUMM	RUEO	RUDO	RUMJ	RUCI	RUED	RUAD	RUWM	RUWJ	RUFT
RUEB	12[illegible]367	2[illegible]077	2888	21223	14685	3409	10671	9516	6815	12727	9248	9385
RUCL	22754	44847	1511	17028	3907	1796	15536	14700	1828	6592	12765	5233
RUMM	1133	1534	17969	3094	1256	6387	571	1454	3186	1315	1854	190
RUEO	32471	33641	4786	84141	10004	2229	18565	10907	9242	18189	13220	11295
RUDO	29071	2883	300	9209	43380	463	2199	2291	591	1569	701	14208
RUMJ	2010	586	5813	1771	241	13372	634	1088	2887	1937	2052	191
RUCI	9345	14369	1036	12129	3374	1002	28077	15042	2193	7545	14503	3419
RUED	9472	14356	2505	16001	4991	1876	11367	25309	1701	10195	8446	4574
RUAD	5040	960	5531	2931	94	1915	820	791	26456	2314	2469	58
RUWM	9200	14431	2928	13130	1156	3115	8088	6534	3046	39329	14817	988
RUWJ	11514	15924	3440	11112	2024	7246	9638	8121	3854	13676	29144	3639
RUFT	18082	4962	110	7496	18610	204	2533	2250	291	1379	1279	30571
RUFL	5852	2809	100	16741	12288	52	2149	2522	168	979	1026	17683
RUAK	401	568	975	1575	94	93	473	831	2394	544	676	46
RUWT	13411	13594	2403	14054	4726	2338	18141	15409	3076	15505	11716	5494
RUWM	5886	2743	11645	9578	557	7361	1857	4407	9340	11087	7431	258
XXXX	17	21	6	26	1	2	5	19	25	6	25	1
TOT	292426	190705	64066	237231	127332	52860	131324	125287	77010	144888	131374	117633

NUMBER OF MESSAGES--TOTAL (CONTINUED)

FROM/TO	RUFL	RUAK	RUWT	RUWM	XXXX	TOTAL
RUEB	5837	2419	18699	6138	0	271104
RUCL	4295	1866	12276	1986	1	167315
RUMM	104	886	1677	3987	1	46654
RUEO	25205	3721	14879	8629	1	313121
RUDO	11897	41	2778	221	0	114868
RUMJ	83	706	1020	4318	4	38633
RUCI	4901	1270	12961	1771	0	137923
RUED	6152	2823	11252	2387	0	131601
RUAD	114	2130	2361	8937	0	62919
RUWM	2267	1174	12135	8585	2	136125
RUWJ	3329	1282	11085	8422	8	139400
RUFT	29996	71	3292	229	1	124356
RUFL	59093	26	2309	189	0	117946
RUAK	45	13263	919	2472	2	25526
RUWT	7216	1682	43151	2011	1	177142
RUWM	788	2898	2657	24832	2	103387
XXXX	0	8	6	18	74	260
TOT	149382	33466	145519	85734	97	2108340

NUMBER OF LINE BLOCKS--TOTAL 7 DAYS ENDING WITH RADAY 10 OF YEAR 1978

FROM/TO	RUEB	RUCL	RUMM	RUEO	RUDO	RUMJ	RUCI	RUED	RUAD	RUWW	RUWJ	RUFT
RUEB	3484651	861858	92640	928728	580492	107046	633147	267539	232053	471762	446242	354880
RUCL	863566	178967	40188	787932	108773	38674	892366	90679	38132	239199	625464	148591
RUMM	21436	49725	224176	88403	56257	139142	24986	41428	95190	28191	104171	7298
RUEO	979025	1381672	177114	3847836	577988	72702	941278	726184	313134	656614	647785	479770
RUDO	781099	99480	14800	1065881	932285	13188	89768	85649	20783	44794	48747	53334
RUMJ	48468	30526	158053	47700	10474	232399	41678	40720	84072	71687	81203	6439
RUCI	338497	79479	25609	565207	129927	27378	1343547	845272	63719	253147	1231314	191918
RUED	332481	503327	82971	720122	200407	60054	822818	1013270	52612	321532	728256	289432
RUAD	147013	57533	137071	73916	3676	43896	56823	18199	538210	85347	56962	2367
RUWW	259648	344714	89393	4686112	22401	80799	4020483	672600	82990	1211380	643180	22103
RUWJ	353913	641284	103578	401420	73959	241265	822157	308489	118101	583575	1261492	209095
RUFT	481545	119519	2871	464209	618877	4926	196299	104849	7546	32233	81133	99264
RUFL	171880	70721	4211	478544	372365	1947	120534	80830	6433	24348	50204	65244
RUAK	16458	11488	26200	43761	885	2898	17564	30410	75983	24442	67444	962
RUWT	768206	830756	94262	682338	203295	66828	1072831	849409	83074	1033761	940731	308887
RUWW	152422	104667	363653	259227	18356	210225	97059	133903	512687	290069	223623	71150
XXXX	71	360	42	70	4	8	15	47	129	12	270	4
TOT	9199371	7690108	1636838	10024609	3922415	1349425	7574953	6344779	2325579	5372093	7238439	4197138

NUMBER OF LINE BLOCKS--TOTAL (CONTINUED)

FROM/TO	RUFL	RUAK	RUWT	RUWW	XXXX	TOTAL
RUEB	207905	85570	536304	219029	0	9806022
RUCL	135888	21937	472934	75800	0	6768090
RUMM	2264	20255	43120	122190	0	1075832
RUEO	754243	211389	683436	314701	0	12964876
RUDO	515711	803	107733	5727	0	3457676
RUMJ	3448	34274	43673	110494	0	1003508
RUCI	149757	30778	559742	73238	0	6463489
RUED	189148	110459	454141	72779	0	6566209
RUAD	4294	48969	77570	261127	0	1614973
RUWW	46401	39374	432937	166766	0	4584791
RUWJ	150370	69561	656876	195347	0	6286876
RUFT	861033	21144	124107	80681	0	4100523
RUFL	1181366	1385	99029	77281	0	3333828
RUAK	746	329860	36167	90963	0	772242
RUWT	293067	53704	2535604	88691	0	9925458
RUWW	21297	130154	83021	556629	0	3168056
XXXX	0	32	25	80	0	1118
TOT	4513838	1202648	6946479	2369367	0	81913507

NUMBER OF MESSAGES--FLASH OR HIGHER 7 DAYS ENDING WITH RADAY 10 OF YEAR 1978

FROM/TO	RUEB	RUCL	RUMM	RUEO	RUDO	RUHJ	RUCI	RUED	RUAD	RUWM	RUWJ	RUFT
RUEB	559	73	20	32	135	36	72	74	41	85	25	26
RUCI	389	382	104	244	260	194	261	296	167	239	262	207
RUMM	4	1	157	10	1	145	2	9	104	30	34	0
RUEO	391	383	104	588	426	195	308	252	124	279	240	241
RUDO	89	69	0	27	413	0	42	72	0	64	1	314
RUHJ	16	3	89	10	0	157	0	2	88	40	32	0
RUCI	89	92	45	25	85	30	52	79	35	161	69	12
RUED	153	31	20	66	140	30	67	111	14	106	16	6
RUAD	9	1	10	25	0	23	0	7	218	0	0	0
RUWM	73	6	8	8	56	11	54	101	0	123	7	2
RUWJ	0	86	13	48	5	43	2	2	40	17	39	41
RUFT	22	74	6	45	80	5	2	0	11	4	21	234
RUFL	15	11	0	51	139	0	4	1	0	2	0	354
RUAK	1	0	6	13	0	4	2	2	46	0	0	0
RUWT	28	123	15	64	20	18	29	35	10	45	58	57
RUHM	77	104	151	61	77	152	55	72	157	94	84	53
XXXX	0	0	0	0	0	0	0	0	0	0	0	0
TOT	1535	1439	868	1319	1839	1043	952	1056	1052	1289	888	1547

NUMBER OF MESSAGES--FLASH OR HIGHER (CONTINUED)

FROM/TO	RUFL	RUAK	RUWT	RUHM	XXAX	TOTAL
RUEB	33	11	56	20	0	994
RUCL	157	81	411	234	0	3810
RUMM	0	37	13	73	0	620
RUEO	556	79	488	221	0	4935
RUDO	313	0	0	0	0	1406
RUHJ	0	19	8	81	0	545
RUCI	56	10	62	46	0	948
RUED	134	6	35	14	0	951
RUAD	0	29	6	71	0	396
RUWM	3	0	7	14	0	473
RUWJ	0	0	44	60	0	440
RUFT	223	6	23	23	0	779
RUFL	445	0	2	0	0	1224
RUAK	0	113	4	22	0	215
RUWT	19	10	91	51	0	670
RUHM	44	49	112	154	0	1496
XXXX	0	0	0	0	0	0
TOT	2183	450	1358	1084	0	19902

NUMBER OF LINE BLOCKS--FLASH OR HIGHER 7 DAYS ENDING WITH RADAY 10 OF YEAR 1978

FROM/TO	RUEB	RUCL	RUMM	RUEO	RUDO	RUMJ	RUCI	RUEN	RUAD	RUWM	RUWJ	RUFT
RUEB	3486	819	209	378	2222	376	683	621	496	831	192	360
RUCI	2028	6521	1178	1626	1943	1430	1711	1517	1223	1466	1620	1959
RUMM	69	3	1454	179	13	1313	35	174	1072	246	192	0
RUEO	3213	6083	1173	6773	4797	1409	2498	1410	1168	1896	1372	2408
RUDO	481	660	0	280	3692	0	264	434	8	424	4	4051
RUMJ	182	10	2005	147	0	1514	0	37	1027	493	406	0
RUCI	457	703	373	192	723	252	412	620	289	1188	497	98
RUED	1487	395	328	945	2248	492	674	1430	192	1114	121	42
RUAD	35	3	143	442	0	329	0	194	2583	0	0	0
RUWM	418	72	138	129	409	191	350	638	8	976	95	16
RUWJ	0	492	78	278	37	347	10	0	240	86	318	281
RUFT	317	579	150	423	1119	125	36	0	275	84	149	2590
RUFL	182	162	0	550	1963	0	32	28	0	25	0	4614
RUAK	24	0	148	222	0	45	35	34	774	0	0	0
RUWT	242	750	117	394	157	143	222	240	80	454	380	416
RUMM	401	563	1637	408	451	1188	272	389	1660	555	542	348
XXXX	0	0	0	0	0	0	0	0	0	0	0	0
TOT	13522	10615	9131	13364	19724	9154	7194	7924	11081	9838	5897	16789

NUMBER OF LINE BLOCKS--FLASH OR HIGHER (CONTINUED)

FROM/TO	RUFL	RUAK	RUWT	RUMM	XXXX	TOTAL
RUEB	438	104	460	148	0	11823
RUCI	1185	592	2513	1418	0	25539
RUMM	0	494	90	441	0	5777
RUEO	8443	531	3003	1279	0	44625
RUDO	3490	0	0	0	0	14330
RUMJ	0	222	66	650	0	6759
RUCI	463	80	418	339	0	7313
RUED	2845	43	255	82	0	12502
RUAD	0	512	117	1040	0	5347
RUWM	24	0	90	215	0	3831
RUWJ	0	0	256	332	0	2758
RUFT	2843	150	103	159	0	9168
RUFL	6744	0	25	0	0	14322
RUAK	0	1421	70	364	0	3135
RUWT	155	75	697	334	0	4860
RUMM	259	458	581	1130	0	10816
XXXX	0	0	0	0	0	0
TOT	27289	4682	8770	7931	0	182905

7 DAYS ENDING WITH RADAY 10 OF YEAR 1978

NUMBER OF OSRI 3411

TRAFFIC BY OSRI

NUMBER	OSRI	LOCAL	AREA	INTER-AREA	TOTAL
1		2858610	2489794	3714958	9063368
2	RUVARIA	365685	947873	67592	1381150
3	RUEKJCS	399265	514224	241285	1156774
4	RULYSGG	285334	529739	313819	1128892
5	RUEOUAA	210082	901702	681	1112465
6	RUWJZZA	136498	848419	99387	1084304
7	RUEBUAA	105832	961342	675	1067849
8	RUCIZZB	125109	753798	140007	1018914
9	RUHGSGG	180187	476835	350415	1007437
10	RUCIZZC	142641	734856	114338	991835
11	RUFRSGG	270228	354455	366577	991260
12	RUWMZZA	134663	759642	103893	991198
13	RMWWAAA	214238	547622	203701	965561
14	RUEOZZB	96150	701424	156320	953894
15	RUEOZZC	120338	704132	127053	951523
16	RUCBSGG	314968	401530	172721	889219
17	RUHPSGG	170174	329714	352345	852233
18	RUWJAIA	125344	612123	98852	836319
19	RUWTBRA	172100	483024	136961	[illegible]
20	RUCLZZA	113835	617981	504[illegible]	
21	RUEWRHA	97188	510926		
22	RUVEGAA	180852	406590		
23	RUEDUAA	414992	300107		4
24	RUWTUAA	68966	62[illegible]	0	4
25	RUCLAPA	182519	[illegible]	0	4
26	RUWTZZA	98521		4	4
27	RUWJHFA	11524	0	4	4
28	RUWTARA	317[illegible]	0	4	4
29	RUEDKFA	[illegible]	0	4	4
30	RUEQBKA		4	0	4
31	RUFDAAA		0	4	4
[illegible]	RUEQBU[illegible]	0	4	0	4
		0	0	4	4
		0	4	0	4
		0	4	0	4
3383	RUCHLFR	0	4	0	4
3384	RUEVDJQ	0	4	0	4
3385	RUTACSA	0	4	0	4
3386	RUEOEFA	0	3	0	3
3387	RUWMAHR	0	3	0	3
3388	RUEORMM	0	3	0	3
3389	RUHGXOZ	3	0	0	3
3390	RUONPLA	0	3	0	3
3391	RUOFSGG	0	0	3	3
3392	RUHGVJU	3	0	0	3
3393	RUOMAAA	0	3	0	3
3394	RUAKMRB	0	0	3	3
3395	RULYZAP	3	0	0	3
3396	RUDOQAA	3	0	0	3
3397	RUCIPFM	0	3	0	3
3398	RUEVHGF	0	3	0	3
3399	RUCNDPE	0	3	0	3
3400	RUMMWUG	0	0	3	3
3401	RGFACSA	0	3	0	3
3402	RUWTAGE	0	3	0	3
3403	RCCENBA	0	3	0	3
3404	RUADKDA	3	0	0	3
3405	RUYLSAA	0	0	3	3
3406	RUWLWPA	0	0	3	3
3407	RULPHNU	0	3	0	3
3408	RUEBOIL	0	3	0	3
3409	RCWECSA	0	0	2	2
3410	RUERNER	0	0	2	2
3411	RUEDARC	2	0	0	2
	SUB-TOTAL	22061799	42436850	17414918	
	TOTAL				81913567

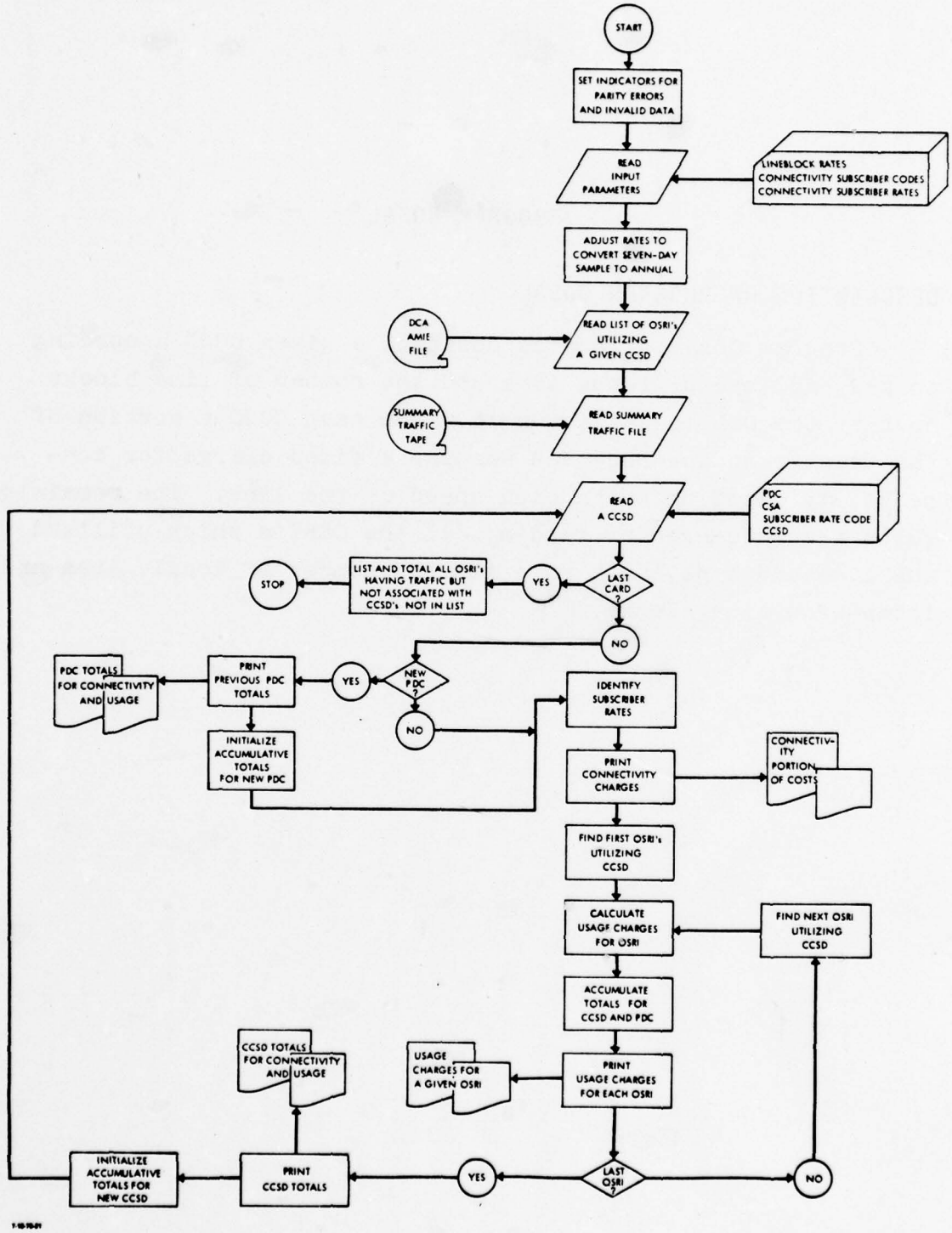
APPENDIX C

PROGRAM COSAL

PROGRAM COSAL

DESCRIPTION OF PROGRAM COSAL

Program Cosal allocates costs to a given CCSD according to the baud speed of the line and the number of line blocks sent by the OSRI's utilizing it. For each CCSD a portion of the total cost are received through a fixed charge for connectivity based upon the baud speed of the line. The remaining costs are recovered by finding all the OSRI's which utilized the line and applying a rate for the number of local, area and inter-area line blocks.



PROGRAM COSAL

INPUT CARD 2

Field	Position	FORTRAN Variable Name	Format	Item
1	4-5	SRC(1)	A2	Code for 1st Connectivity Rate
2	9-10	SRC(2)	A2	Code for 2nd Connectivity Rate
3	14-15	SRC(3)	A2	Code for 3rd Connectivity Rate
4	19-20	SRC(4)	A2	Code for 4th Connectivity Rate
.	.			.
.	.			.
.	.			.
47	.	SRC(47)		Code for 47th Connectivity Rate

PROGRAM COSAL

INPUT CARD 1

Field	Position	FORTRAN Variable Name	Format	Item
1	1-10	RLB(1)	F10.0	Rate per line block for local messages
2	11-20	RLB(2)	F10.0	Rate per line block for area messages
3	21-30	RLB(3)	F10.0	Rate per line block for inter-area messages

PROGRAM COSAL

INPUT CARD 3

Field	Position	FORTRAN Variable Name	Format	Item
1	4-5	SR(1)	F5.0	Subscriber rate for 1st connectivity code
2	9-10	SR(2)	F5.0	Subscriber rate for 2nd connectivity code
3	14-15	SR(3)	F5.0	Subscriber rate for 3rd connectivity code
4	19-20	SR(3)	F5.0	Subscriber rate for 4th connectivity code
.	.	.	.	.
.	.	.	.	.
.	.	.	.	.
48		SR(48)	F5.0	Subscriber rate for 48th connectivity code

PROGRAM COSAL

INPUT CARD 4

Field	Position	FORTRAN Variable Name	Format	Item
1	1-5	PDC	A5	PDC
2	11-30	CSA(J)	4A5	CSA
3	36-37	SUBR	A2	Subscriber rate
4	41-48	CCSD	A7	CCSD

Note: Last card of inputs must have ZZZZZ in field 1.

PROGRAM COSAL

INPUT AMIE FILE

PHYSICAL CHARACTERISTICS

Tape:	7 track
Density:	800 bsi
Parity:	Even
Character Code:	BCD
Record Size:	30 characters/logical record
Blocking:	26 logical records/physical block
Label:	Unlabeled

LOGICAL RECORD

Field	Position	FORTRAN Variable Name	Format	Item
1	1-4	RI(1)	A4	First four characters of OSRI
2	5-6	RI(2)	A2	Next two characters of OSRI
3	7	RI(3)	A1	Last digit of OSRI
4	8-15	CCSD	A8	CCSD

```
      PROGRAM COSAL(INPUT,OUTPUT,TAPE5=INPUT,TAPE6=OUTPUT,TAPE1=1,      3000010
     1               TAPE2=2)                                           3000020
C                                                                       3000030
C     THIS PROGRAM ALLOCATION COSTS TO A GIVEN CCSD ACCORDING           3000040
C          TO THE BAUD SPEED OF THE LINE AND THE NUMBER OF              3000050
C          LINE BLOCKS SENT BY OBRI UTILIIIZING IT                      3000060
C                                                                       3000070
      COMMON BUF(360)                                                   3000080
      DIMENSION WCCSD(4000), WORI(4000,3)                               3000090
      DIMENSION TRT(4000,3), KISUM(4000,3)                              3000100
      DIMENSION LINE(30), KT(3), CSA(4)                                 3000110
      DIMENSION RLB(3), SRC(47), SR(48)                                 3000120
      DIMENSION SUM(3), TSUM(3)                                         3000130
      DIMENSION PSUM(3)                                                 3000140
C                                                                       3000150
C     SET INICATATORS TO IGNURE TAPE PARITY ERRORS                      3000160
C                                                                       3000170
      NPE=0                                                             3000180
      NCD=0                                                             3000190
C                                                                       3000200
      CALL NOPCHK(0)                                                    3000210
C                                                                       3000220
C     SET INDICATORS TO SKIP ANY RECORD WITH INVALID DATA ELEMENT       3000230
C                                                                       3000240
      IGO=1                                                             3000250
      CALL INCK(0)                                                      3000260
      GO TO (1,200,3,0,400),IGO                                         3000270
    1 CONTINUE                                                          3000280
      IGO=2                                                             3000290
C                                                                       3000300
C     READ RATE PER LINE BLOCK FOR LOCAL,AREA,AND INTER-AREA            3000310
C                                                                       3000320
      READ(5,7001) (RLB(L),I=1,3)                                       3000330
C                                                                       3000340
C     READ CODES FOR SUBSCRIBER RATES FOR CONNECTIVITY CHARGES          3000350
C                                                                       3000360
```

```
      READ(5,7002) (SRC(L),L=1,47)                                      3000370
C                                                                       3000380
C     READ SUBSCRIBER RATES FOR CONNECTIVITY CHARGES                    3000390
C                                                                       3000400
      READ(5,7003) (SR(L),L=1,48)                                       3000410
C                                                                       3000420
C     PRINT RATES USED IN THIS RUN                                      3000430
C                                                                       3000440
      WRITE(6,8012)                                                     3000450
      WRITE(6,8013) (RLR(L),L=1,3)                                      3000460
      WRITE(6,8014)                                                     3000470
      DO 10 J=1,47,6                                                    3000480
      K=J+5                                                             3000490
      IF(K.GT.47) K=47                                                  3000500
      WRITE(6,8015) (SRC(L),SR(L),L=J,K)                                3000510
   10 CONTINUE                                                          3000520
C                                                                       3000530
C     CONVERT SEVEN-DAY SAMPLE TO YEARLY TOTALS                         3000540
C                                                                       3000550
      DO 50 L=1,3                                                       3000560
      RLR(L)=RLR(L)*52.0                                                3000570
   50 CONTINUE                                                          3000580
      DO 60 L=1,48                                                      3000590
      SR(L)=SR(L)*12.0                                                  3000600
   60 CONTINUE                                                          3000610
C                                                                       3000620
C     READ CROSS-WALK ASSOCIATING AN OSRI TO A GIVEN CCSD               3000630
C                                                                       3000640
C     BUF IN ALLOWS PROGRAM TO READ ONE ENTIRE RECORDS FROM INPUT TAPE  3000650
C                                                                       3000660
      PRINT 8010                                                        3000670
C                                                                       3000680
  100 CONTINUE                                                          3000690
C                                                                       3000700
      BUFFER IN(1,0) (BUF(1),BUF(78))                                   3000710
C                                                                       3000720
```

```
  120 CONTINUE                                                          3000730
C                                                                       3000740
C     UNIT STATEMENT CHECKS TO SEE IF BUFFER IN IS DONE                 3000750
C                                                                       3000760
      IF(UNIT,1) 130,140,300,250                                        3000770
C                                                                       3000780
C     WHEN BUFFER IN IS NOT DONE                                        3000790
C     XRCL ALLOWS OTHER IN QUEUE TO EXECUTE FOR 9 MILLISECONDS          3000800
C                                                                       3000810
  130 CONTINUE                                                          3000820
      CALL XRCL                                                         3000830
      GO TO 120                                                         3000840
C                                                                       3000850
  140 CONTINUE                                                          3000860
C                                                                       3000870
C     LENGTH FUNCTION RETURNS (IS THE VALUE OF) THE NUMBER JUST READ    3000880
C                                                                       3000890
      L=LENGTH(1)                                                       3000900
      L1=10*L                                                           3000910
      L1=L1/30*30                                                       3000920
C                                                                       3000930
      DO 200 IS=1,L1,30                                                 3000940
C                                                                       3000950
C     MCHAR MOVES 30 CHARACTERS AT A TIME TO ANOTHER ARRAY CALLED LINE  3000960
C                                                                       3000970
      CALL MCHAR(IS,BUF,1,LINE,30)                                      3000980
C                                                                       3000990
C     DECODE IS EQUIVALENT TO A READ STATEMENT FOR UNBLOCKED DATA       3001000
C                                                                       3001010
      DECODE (30,7004,LINE) RI(1),RT(2),RI(3),CCSD                      3001020
C                                                                       3001030
      NCD=NCD,1                                                         3001040
      MCCSD(NCD)=CCSD                                                   3001050
      DO 150 L=1,3                                                      3001060
      MORI(NCD,L)=RI(L)                                                 3001070
  150 CONTINUE                                                          3001080
```

```
C                                                                       3001090
C     TEMPORARY OUTPUT                                                  3001100
C                                                                       3001110
      WRITE(6,8001) NCD,WCOSU(NCD),(WORI(NCD,L),L=1,3)                  3001120
C                                                                       3001130
C                                                                       3001140
  200 CONTINUE                                                          3001150
C                                                                       3001160
C     READY FOR NEXT BLOCK                                              3001170
C                                                                       3001180
      GO TO 100                                                         3001190
C                                                                       3001200
C     PARITY ERROR ON INPUT TAPE                                        3001210
C                                                                       3001220
  250 CONTINUE                                                          3001230
C                                                                       3001240
      NPE=NPE+1                                                         3001250
C                                                                       3001260
C     WRITE REMARK IN DAYFILE                                           3001270
C                                                                       3001280
      CALL REMARK(17HREAD PARITY ERROR)                                 3001290
C                                                                       3001300
      WRITE(6,9001) NPE                                                 3001310
C                                                                       3001320
C     WRITE OUT ENTIRE BLOCK AND IGNORE BLOCK FOR DATA                  3001330
C                                                                       3001340
      DO 210 L=1,79,2                                                   3001350
      L2=L1+2                                                           3001360
      WRITE(6,9002) L1,(BUF(L),L=L1,L2)                                 3001370
  210 CONTINUE                                                          3001380
C                                                                       3001390
C     CONTINUE WITH READING NEXT BLOCK                                  3001400
C                                                                       3001410
      GO TO 100                                                         3001420
C                                                                       3001430
C     END OF TAPE                                                       3001440
```

```
C                                                                       3001450
  300 CONTINUE                                                          3001460
C                                                                       3001470
      KPDC=1                                                            3001480
      IGO=3                                                             3001490
C                                                                       3001500
C     READ TAPE CONTINING SUMMARY TRAFFIC FOR PERIOD                    3001510
C                                                                       3001520
C     VARIABLE   POSITION   FORMAT    CONTENTS                          3001530
C                                                                       3001540
C     NDAY         1-10       I10     NUMBER OF DAYS IN SUMMARY         3001550
C     NRD         11-20       I10     LAST RADAY IN SUMMARY PERIOD      3001560
C     NYR         21-30       I10     YEAR OF SUMMARY PERIOD            3001570
C     NTORI       31-40       I10     NUMBER OF UNIQUE OSRI SENDING     3001580
C                                       TRAFFIC DURING SUMMARY PERIOD     3001590
C                                                                       3001600
      PRINT 8011                                                        3001610
C                                                                       3001620
      READ(2,7005) NDAY,NRD,NYR,NTORI                                   3001630
C                                                                       3001640
      DO 310 J=1,NTORI                                                  3001650
C                                                                       3001660
      READ(2,7006) (TRI(J,L),L=1,3),(KTSUM(J,L),L=1,3)                  3001670
      KSUM=KTSUM(J,1)+KTSUM(J,2)+KTSUM(J,3)                             3001680
C                                                                       3001690
C     TEMPORARY OUTPUT                                                  3001700
C                                                                       3001710
      WRITE(6,7106) (TRI(J,L),L=1,3),(KTSUM(J,L),L=1,3),KSUM            3001720
C                                                                       3001730
  310 CONTINUE                                                          3001740
C                                                                       3001750
      IGO=4                                                             3001760
C                                                                       3001770
      GNDTOT=0.0                                                        3001780
C                                                                       3001790
      WRITE(6,8000)                                                     3001800
```

```
      NL=0                                                              3001810
C                                                                       3001820
  400 CONTINUE                                                          3001830
C                                                                       3001840
C     READ CCSD,OWNERSHIP,AND RATES FROM CARDS                          3001850
C                                                                       3001860
C     FORMAT OF INFORMATION                                             3001870
C                                                                       3001880
C     VARIABLE   POSITION   FORMAT   CONTENTS                           3001890
C                                                                       3001900
C     PDC          1-5        A5      PDC                             3001910
C     CSA         11-30       4A5     CSA                             3001920
C     SUBR        36-37        A2     SUBSCRIBER RATE                 3001930
C     CCSD        41-48        A7     CCSD                            3001940
C                                                                       3001950
      READ(5,7007) PDC,(CSA(J),J=1,4),SUBR,CCSD                         3001960
C                                                                       3001970
C     IF NEW PDC POINT PDC TOTALS                                       3001980
C                                                                       3001990
      IF(KPDC.NE.1) GO TO 410                                           3002000
      TPDC=PDC                                                          3002010
      KPDC=2                                                            3002020
      GO TO 420                                                         3002030
  410 CONTINUE                                                          3002040
      IF(TPDC.EQ.PDC) GO TO 460                                         3002050
C                                                                       3002060
      WRITE(6,8008) TPDC,(PSUM(L),L=1,3),PTORI,PTCCSD,PTOTAL            3002070
C                                                                       3002080
      NL=NL+2                                                           3002090
C                                                                       3002100
  420 CONTINUE                                                          3002110
      DO 430 L=1,3                                                      3002120
      PSUM(L)=0.0                                                       3002130
  430 CONTINUE                                                          3002140
      PTORI=0.0                                                         3002150
      PTCCSD=0.0                                                        3002160
```

```
      PTOTAL=0.0                                                        3002170
      TPDC=PDC                                                          3002180
C                                                                       3002190
  460 CONTINUE                                                          3002200
C                                                                       3002210
C     CHECK FOR LAST CARD -- ZZZZZ                                      3002220
C                                                                       3002230
      IF(PDC.EQ.5HZZZZZ) GO TO 1000                                     3002240
C                                                                       3002250
      TOTAL=0.0                                                         3002260
      TCCSD=0.0                                                         3002270
C                                                                       3002280
C     IDENTIFY SUBSCRIBER DATA                                          3002290
C                                                                       3002300
      DO 500 K=1,47                                                     3002310
      KC=K                                                              3002320
      IF(SUBR.EQ.SRC(K)) GO TO 510                                      3002330
  500 CONTINUE                                                          3002340
      KC=48                                                             3002350
  510 CONTINUE                                                          3002360
C                                                                       3002370
C     PRINT PDC-CSA-CCSD-SUBSCRIBER RATE                                3002380
C                                                                       3002390
      WRITE(6,8003) PDC,(CSA(J),J=1,4),CCSD,SR(KC)                      3002400
      NL=NL+2                                                           3002410
C                                                                       3002420
C     INITIALIZE ARRAYS FOR SUMMATION                                   3002430
C                                                                       3002440
      DO 520 L=1,3                                                      3002450
      SUM(L)=0                                                          3002460
  520 CONTINUE                                                          3002470
C                                                                       3002480
C     FIND CCSD IN OSPI LIST                                            3002490
C                                                                       3002500
      KFIRST=1                                                          3002510
      KNCD=1                                                            3002520
```

```
C                                                                       3002530
  515 CONTINUE                                                          3002540
                                                                        3002550
      IF(KNCD.GT.NCD) GO TO 526                                         3002560
C                                                                       3002570
      DO 525 J=KNCD,NCD                                                 3002580
      JSD=J                                                             3002590
      IF(CCSD.EQ.WCCSD(J)) GO TO 530                                    3002600
  525 CONTINUE                                                          3002610
      IF(KFIRST.EQ.1) WRITE(6,8002) CCSD                                3002620
      IF(KFIRST.EQ.1) NL=NL+1                                           3002630
C                                                                       3002640
  526 CONTINUE                                                          3002650
      TORI=0.0                                                          3002660
      DO 527 L=1,3                                                      3002670
      TORI=TORI+SUM(L)                                                  3002680
  527 CONTINUE                                                          3002690
C                                                                       3002700
      TCCSD=TORI                                                        3002710
      TOTAL=TCCSD+SR(KC)                                                3002720
      DO 528 L=1,3                                                      3002730
      PSUM(L)=PSUM(L)+SUM(L)                                            3002740
  528 CONTINUE                                                          3002750
      PTORI=PTORI+TORI                                                  3002760
      PTCCSD=PTCCSD+SR(KC)                                              3002770
      PTOTAL=PTOTAL+TOTAL                                               3002780
      GRDTOT=GRDTOT+TOTAL                                               3002790
C                                                                       3002800
      WRITE(6,8005)(SUM(L),L=1,3),TORI,TCCSD,TOTAL                      3002810
C                                                                       3002820
      NL=NL+2                                                           3002830
      IF(NL.LT.53) GO TO 400                                            3002840
      NL=0                                                              3002850
      WRITE(6,8000)                                                     3002860
C                                                                       3002870
      GO TO 400                                                         3002880
```

```
C                                                                       3002890
C       FIND OSRI                                                       3002900
C                                                                       3002910
  53( CONTINUE                                                          3002920
C                                                                       3002930
        DO 600 J=1,NTORI                                                3002940
C                                                                       3002950
        IF(WORI(JSO,1).NE.TRI(J,1)) GO TO 600                           3002960
C                                                                       3002970
        IF(WORI(JSO,2).EQ.2H    ) GO TO 560                             3002980
C                                                                       3002990
        IF(WORI(JSO,2).NE.TRI(J,2)) GO TO 600                           3003000
C                                                                       3003010
        IF(WORI(JSO,3).EQ.TRI(J,3))GO TO 560                            3003020
C                                                                       3003030
        DO 550 K=1,NCO                                                  3003040
        DO 540 L=1,3                                                    3003050
        IF(WORI(K,L).NE.TRI(J,L)) GO TO 550                             3003060
  540 CONTINUE                                                          3003070
        GO TO 600                                                       3003080
  550 CONTINUE                                                          3003090
C                                                                       3003100
  560 CONTINUE                                                          3003110
C                                                                       3003120
C       CALCULATE DISTANCE CHANGES                                      3003130
C                                                                       3003140
        TORI=0.0                                                        3003150
        DO 570 L=1,3                                                    3003160
        TSUM(L)=KTSUM(I,L)*RLA(L)                                       3003170
        TORI=TORI+TSUM(L)                                               3003180
        SUM(L)=SUM(L)+TSUM(L)                                           3003190
  570 CONTINUE                                                          3003200
C                                                                       3003210
        WRITE(6,8004)(TRI(J,L),L=1,3),(TSUM(L),L=1,3),TORI              3003220
        TRI(J,1)=4H7777                                                 3003230
                                                                        3003240
```

```
      NL=NL+1                                                          3003250
      IF(NL.LT.53) GO TO 600                                           3003260
      NL=0                                                             3003270
      WRITE(6,8000)                                                    3003280
C                                                                      3003290
  600 CONTINUE                                                         3003300
C                                                                      3003310
C     CHECK OF OTHER OSRI USING SAME CCSD                              3003320
C                                                                      3003330
      KFIRST=2                                                         3003340
      KNCD=JSD+1                                                       3003350
C                                                                      3003360
C     READ NEXT CCSD                                                   3003370
C                                                                      3003380
      GO TO 515                                                        3003390
C                                                                      3003400
C     END OF CCSD LIST CHECK FOR OSRI NOT ACCOUNTED FOR                3003410
C                                                                      3003420
 1000 CONTINUE                                                         3003430
C                                                                      3003440
      WRITE(6,8000)                                                    3003450
      WRITE(6,8007)                                                    3003460
      NL=5                                                             3003470
C                                                                      3003480
      DO 1110 L=1,2                                                    3003490
      SUM(L)=0                                                         3003500
 1110 CONTINUE                                                         3003510
      TCCSD=0.0                                                        3003520
C                                                                      3003530
      DO 1200 J=1,NTORI                                                3003540
C                                                                      3003550
      IF(TRI(J,1).EQ.4HZZZZ) GO TO 1200                                3003560
C                                                                      3003570
      TORI=0                                                           3003580
      DO 1120 L=1,2                                                    3003590
      TSUM(L)=KTSUM(J,L)*RLR(L)                                        3003600
```

```
      TORI=TORI+TSUM(L)                                                 3003610
      SUM(L)=SUM(L)+TSUM(L)                                             3003620
 1120 CONTINUE                                                          3003630
C                                                                       3003640
      WRITE(6,8004)(TRI(J,L),L=1,3),(TSUM(L),L=1,3),TORI                3003650
C                                                                       3003660
      NL=NL+1                                                           3003670
      IF(NL.LT.53) GO TO 1200                                           3003680
      NL=0                                                              3003690
      WRITE(6,8000)                                                     3003700
C                                                                       3003710
 1200 CONTINUE                                                          3003720
C                                                                       3003730
      TORI=0.0                                                          3003740
      DO 1210 L=1,3                                                     3003750
      TORI=TORI+SUM(L)                                                  3003760
 1210 CONTINUE                                                          3003770
C                                                                       3003780
      TCCSD=TORI                                                        3003790
      TOTAL=TCCSD                                                       3003800
      GRDTOT=GRDTOT+TOTAL                                               3003810
C                                                                       3003820
      WRITE(6,8005)(SUM(L),L=1,3),TORI,TCCSD,TOTAL                      3003830
C                                                                       3003840
      WRITE(6,8006)GRDTOT                                               3003850
C                                                                       3003860
      STOP                                                              3003870
C                                                                       3003880
C     FORMATS FOR INPUT                                                 3003890
C                                                                       3003900
 7001 FORMAT(3F10.0)                                                    3003910
 7002 FORMAT(16(3X,A2))                                                 3003920
 7003 FORMAT(16F5.0)                                                    3003930
 7004 FORMAT(A4,A2,A1,1X,A8)                                            3003940
 7005 FORMAT(4I10)                                                      3003950
 7006 FORMAT(A4,A2,A1,3I15)                                             3003960
```

```
 7106 FORMAT(1X,A4,A2,A1,4I5)                                              3003970
 7007 FORMAT(A5,5X,4A5,5X,A2,3X,A8)                                        3003980
 7107 FORMAT(1X,A5,5X,4A5,5X,A2,3X,A8)                                     3003990
C                                                                          3004000
C     FORMATS FOR OUTPUT                                                   3004010
C                                                                          3004020
 8000 FORMAT(1H1///                                                        3004030
     1          73X,8HINTER-        OSRI/                                 3004040
     2 20H  PDC          CSA              CCSD      ITEM         LOCAL     3004050
     3   AREA        AREA        TOTAL      SUBTOTAL           TOTAL      )  3004060
 8001 FORMAT(I10,5X,A8,5X,A4,A2,A1)                                        3004070
 8002 FORMAT(22H CCSD NOT IN AMIE FILE,2A,A8)                              3004080
 8003 FORMAT(1H0,A5,2X,4A5,2X,A8,2X,12HCONNECTIVITY,40X,F13.2)             3004090
 8004 FORMAT(40X,A4,A2,A1,3F11.2,F12.2)                                    3004100
 8005 FORMAT(40X,5HTOTAL,2X,3F11.2,F12.2,F13.2,F15.2)                      3004110
 8006 FORMAT(//10X,11HGRAND TOTAL,84X,F15.2)                               3004120
 8007 FORMAT(///5CH OSRI IN AMIE FILE USING A CCSD NOT IN DECCO FILES//)   3004130
 8008 FORMAT(1H0,A5,2X,5HTOTAL,34X,3F11.2,F12.2,F13.2,F15.2)               3004140
 8010 FORMAT(1H1,5X,9HAMIE FILE)                                           3004150
 8011 FORMAT(1H1,5X,12HTRAFFIC FILE)                                       3004160
 8012 FORMAT(1H1///53X,14HRAIE STRUCTURE///)                               3004170
 8013 FORMAT(46X, 27HUSAGE RATES (PER LINEBLOCK)//                         3004180
     1  25X,5HLOCAL,F10.4,10X,4HAREA,F10.4,10X,10HINTER-AREA,F10.4///)     3004190
 8014 FORMAT(51X,17HCONNECTIVITY RATE//)                                   3004200
 8015 FORMAT(6(10X,A2,F8.5)/)                                              3004210
C                                                                          3004220
C     FORMATS FOR SYSTEM OUTPUT                                            3004230
C                                                                          3004240
 9001 FORMAT(18H PARITY ERROR NO.  ,I5)                                    3004250
 9002 FORMAT(1X,I10,4X,1H*,3A10,1H*)                                       3004260
C                                                                          3004270
      END                                                                  3004280
```

POC		CSA		CCSD	ITEM	LOCAL	AREA	INTER-AREA	OSRI TOTAL	SUBTOTAL	TOTAL
					TOTAL	12204.61	4806.83	141.02	17152.46	17152.46	21832.46
AA63D	WU	D	11447	JUEE7G18	CONNECTIVITY					14040.00	
					RUCIFWA	9793.47	6419.94	284.54	16491.96		
					TOTAL	9793.47	6419.94	284.54	16491.96	16491.96	30531.96
AA63D	WU	D	11446	JUEE7G25	CONNECTIVITY					14040.00	
					RUWTAPA	8581.66	13015.08	286.42	21883.16		
					TOTAL	8581.66	13015.08	286.42	21883.16	21883.16	35923.16
AA63D	WU	D	11461	JUEE7H08	CONNECTIVITY					14040.00	
					RUCIEWA	11524.45	11354.55	339.46	23219.46		
					TOTAL	11524.45	11354.55	339.46	23219.46	23219.46	37259.46
AA63D	WU	D	11465	JUEE7H30	CONNECTIVITY					14040.00	
					RUWTDPA	10646.40	15952.25	227.76	26226.41		
					TOTAL	10646.40	15952.25	227.76	26226.41	26226.41	40266.41
AA63D	WU	D	11217	JUEE7H78	CONNECTIVITY					14040.00	
					RUWJSLA	5531.14	11604.53	989.66	18125.33		
					RUWJSLC	1927.33	3264.77	711.36	5903.46		
					TOTAL	7458.46	14869.30	1701.02	24028.78	24028.78	38068.78
AA63D	TOTAL					287448.93	57247A.70	108415.01	968334.64	365040.00	1333374.64
AA64D	WU	D	00478	JUEE7Z05	CONNECTIVITY					4680.00	
					RUWTAWA	497.12	81.43	5.62	584.17		
					TOTAL	497.12	81.43	5.62	584.17	584.17	5264.17
AA64D	WU	D	00488	JUEE7Z06	CONNECTIVITY					4680.00	
					RUCLRKA	203.42	378.14	0.00	581.57		
					TOTAL	203.42	378.14	0.00	581.57	581.57	5261.57
AA64D	WU	D	00818	JUEE7Z07	CONNECTIVITY					4680.00	
					RUWTAKA	447.68	297.18	238.99	963.85		
					TOTAL	447.68	297.18	238.99	963.85	963.85	5623.85
AA64D	WU	D	00493	JUEE7L24	CONNECTIVITY					21840.00	
					RUVMRIA	21717.70	43778.12	96.10	65591.92		
					RUVMRIF	2787.62	16701.52	7091.76	26580.89		
					RUVMRIG	4380.61	8917.27	94.22	13312.10		
					RUVMARA	1216.38	7023.28	386.26	8625.92		
					RUVMRIH	99.01	3017.66	239.62	3356.29		
					RUVMRIE	0.00	2914.70	0.00	2914.70		

APPENDIX D

SPECIALIZED SYSTEM FEATURE UTILIZED

SPECIALIZED SYSTEM FEATURE UTILIZED

The three programs included in these appendices are written in FORTRAN for the CDC 6400 computer. With very minor modifications in the program, the routines are adaptable to any computer with core storage of at least 120K words. Although several special features of SCOPE 3.20.0 SCM Version A 8/31/70 FORTRAN were utilized, none are indispensable for use of the programs. These special functions and subroutines are described below.

1. INCK (0) — An input check that provides a means of determining, under program control, that illegal characters have been encountered during a FORTRAN BCD input operation, and provides an optional return to execution if an input error has occurred.

2. NOPCHK (0) — A parity error check that shifts responsibility for handling physical tape parity errors to the standard system routine.

3. BUFFER IN (j.p) (A,B) — The statement transfers information from tape unit j in mode p to storage locations A through B. Only one logical record is read for each BUFFER IN statement. A p of zero designates even parity while one designates odd parity.

4.	IF (UNIT,j)	A test on unit j to determine the record being transferred from unit u to buffer has been completed.
5.	XCRL	A check on the buffering-in of data that permits others in system to execute if buffering operation is not yet completed.
6.	LENGTH (J)	Number of words read on previous read request on file J.
7.	MCHAR (J,A,I,B,N)	This statement transfers N characters starting at the Ith character in the string (array) A into the string B starting with the Ith character position.
8.	DECODE (c,n,v) L	The information in c consecutive BCD characters (starting at location v) is transmitted according to the Format n and stored in the list variables, L.
9.	REMARK	Allows user to print a statement in the day file.
10.	MESWAIT	Writes a message on the console and waits for the operator to perform a specified operation.

APPENDIX E

A GENERALIZED MODEL FOR ALLOCATING COSTS

A GENERALIZED MODEL FOR ALLOCATING COSTS

The material below is reprinted from IDA Study S-487 *Cost Allocation for AUTODIN: An Economic Analysis*, Volume I, pp 28-34.

If we wish to exercise the option of assigning a fixed charge per message it is only necessary to select a value for m and then calculate the revenue that these charges bring in:

(6) $$M_1 = m_x x'$$

(7) $$M_2 = m_y y'$$

(8) $$M_3 = m_z z'.$$

The revenue from the messages must be subtracted from the usage cost and the remainder allocated by line blocks.

(3-a) $$\tilde{C}_1 = \frac{S - R - M_1 - M_2 - M_3}{x + y + z}$$

(4-a) $$\tilde{C}_2 = \frac{S - R - M_1 - M_2 - M_3}{x + y + z} + \frac{aR + T_c}{y + z}$$

(5-a) $$\tilde{C}_3 = \frac{S - R - M_1 - M_2 - M_3}{x + y + z} + \frac{aR + T_c}{y + z} + \frac{bR + T_{os}}{z}.$$

If we wish to exercise the option of allocating a certain fraction of usage costs to messages and the remainder to line blocks, the procedure is even more simple. The per unit costs of messages would be:

(3-b) $$\hat{C}_1 = \frac{\beta(S - R)}{x' + y' + z'}$$

(4-b) $$\hat{C}_2 = \frac{\beta(S - R)}{x' + y' + z'} + \frac{\beta(aR + T_c)}{y' + z'}$$

(5-b) $$\hat{C}_3 = \frac{\beta(S - R)}{x' + y' + z'} + \frac{\beta(aR + T_c)}{y' + z'} + \frac{\beta(bR + T_{os})}{z'}$$

The per unit line block costs for local, area, and inter-area would be:

$$(3\text{-}c)\quad \bar{C}_1 = \frac{(1-\beta)(S-R)}{x+y+z}$$

$$(4\text{-}c)\quad \bar{C}_2 = \frac{(1-\beta)(S-R)}{x+y+z} + \frac{(1-\beta)(aR+T_c)}{y+z}$$

$$(5\text{-}c)\quad \bar{C}_3 = \frac{(1-\beta)(S-R)}{x+y+z} + \frac{(1-\beta)(aR+T_c)}{y+z} + \frac{(1-\beta)(bR+T_{os})}{z}$$

2. Precedence Charges

It is a simple matter to introduce differential charges for precedence into the formulas. One only need normalize on the cost of non-FLASH messages and then multiply this cost by a factor or add some fixed amount to arrive at the FLASH message cost. Equations (2), (3), and (4) would need to be modified slightly to obtain the unit cost for non-FLASH messages. If a factor is used, the modification would consist of multiplying the number of FLASH messages contained in x, y, and z by the factor before summing. The denominators in these equations then would be the number of normalized messages. Alternatively, if a fixed charge per FLASH message is assigned, the total FLASH charge can be subtracted from the costs (S-R) before allocating the remainder. Our program permits any of these methods to be used and also permits local, area, and inter-area FLASH messages to be assessed differently.

We would recommend, however, that precedence *not* be made a part of the process of calculating before-the-fact charges for usage. We believe there should be a charge for precedence but the revenue collected simply should be subtracted from the following year's costs before they are allocated. Agencies cannot reasonably forecast FLASH usage, but a charge and an accounting for such use are desirable from a managerial viewpoint.

Having examined all the characteristics of AUTODIN that impinge upon the problem of allocating costs, it is possible now to integrate them and arrive at a general model that can be used to calculate appropriate connectivity, usage, area, and precedence charges as a function of various decision parameters and variables. All of the variables and parameters have been discussed earlier so we simply shall define them and describe how they can be put together to solve the cost allocation problem.

We define the following symbols:

S = total annual cost of switches (including both memory and throughput but not trunk leases)

$R = \alpha S$ = total connectivity costs (total annual cost of memory)[1]

D = portion of switch (connectivity) costs to be allocated by connectivity charges

d = connectivity fee per weighted unit

a = ratio of memory used for CONUS trunks to total CONUS memory available (this is 0.23 in the previous example)[2]

b = ratio of memory used for overseas connecting trunks to total CONUS memory available

aR = cost of memory for CONUS long distance

bT = cost of memory for overseas long distance

T_c = cost of CONUS trunks plus area trunks overseas

T_{os} = cost of overseas connecting trunks

N = number of weighted units (obtained by multiplying number of low-speed lines by 3, medium speeds by 9, high speeds by 14, and adding)

---

[1] R can be measured directly or it can be defined as the product of a ratio α and the cost of switches: $R = \alpha S$. This definition is useful if α is either constant over time or is the decision parameter whose value is changed from period to period.

[2] Some thought should be given to whether the denominator of this ratio should be total CONUS capacity or total memory used for all connections. The latter allocates the cost of "unused" memory capacity to both local and long distance.

$$\text{Total Revenue is } (1 - a - b)R + xC_1 + yC_2 + zC_3$$

$$= (1 - a - b)R + S - R + aR + T_c + bR + T_{os}$$

$$= (1 - a - b)R + S - R + aR + bR + T_c + T_{os}$$

$$= S + T_c + T_{os} .$$

The latter is equal to total costs.

1. Usage Charges for Both Messages and Line Blocks

The methodology described above is applicable regardless of whether messages or line blocks are the measure of usage. The variables, x, y, and z could be defined as the number of units of either. It is a relatively simple matter to extend the methodology to permit charges to be levied for both messages and line blocks. The breakdown between them can be determined in either of two essentially equivalent ways. One permits a decision to be made on the cost per message, for example 10 cents per local message, while the other permits a decision to be made on what fraction of costs are to be allocated by messages and what fraction by line blocks.

To illustrate how each would be applied, we shall define the following variables:

x = number of local line blocks
y = number of area line blocks
z = number of inter-area line blocks
x' = number of local messages
y' = number of area messages
z' = number of inter-area messages
m_x = fixed charge per local message
m_y = fixed charge per area message
m_z = fixed charge per inter-area message
β = fraction of usage costs allocated to messages
$1-\beta$ = fraction of usage costs allocated to line blocks.

x = number of local or single switch messages

y = number of area (e.g., CONUS) long distance messages

z = number of inter-area messages.

In accordance with the earlier discussion, aR, bR, T_c and T_{os} (trunks and trunk connections) should be allocated among long distance users as a function of usage. This means that aR and bR should be subtracted from the total connectivity cost before connectivity charges are calculated. Costs to be allocated by *connectivity charges* (symbolized by D) thus would be:

(1) $$D = R - (a + b)R = (1 - a - b)R.$$

The connectivity fee per *weighted unit* would be:

(2) $$d = \frac{D}{N} = \frac{(1 - a - b)R}{N}.$$

This cost should be multiplied by 3, 9, and 14 to obtain the access charges for slow, medium, and high speed, respectively.

The message unit charges must be calculated separately for local, area, and inter-area calls.[1] The cost per message unit for local (single switch) calls, C_1, will include none of the costs associated with long distance. It is equal to switch costs less connectivity costs divided by the total number of message units:

(3) $$C_1 = \frac{S - R}{x + y + z}.$$

The total revenue collected for single switch calls would be xC_1.

---

[1]The term "message unit" here refers to either messages or line blocks, whichever is selected as the unit of measure. We later describe the process of calculating charges when both messages and line blocks are assessed.

The cost per message unit for area (CONUS, Europe, or Asia) messages would be that for single switch plus the allocation of costs associated with trunks and trunk connectivity within all areas:

$$C_2 = \frac{S - R}{x + y + z} + \frac{aR + T_c}{y + z} . \tag{4}$$

The area trunk costs are allocated to both area and overseas messages because any overseas message originating at a switch other than the gateway switch will use area trunks and memory capacity as well as the overseas trunks and capacity. The total revenue collected for area messages would be yC_2.

The cost per message unit for inter-area messages would be that for an area message plus the allocation of costs for overseas trunks and connectivity:

$$C_3 = \frac{S - R}{x + y + z} + \frac{aR + T_c}{y + z} + \frac{bR + T_{os}}{z} . \tag{5}$$

The total revenue collected for overseas calls would be zC_3. If one were to add the total connectivity charges and the sum of the usage charges one would find that our formulas produce the correct amount of revenue. This can be shown rather easily.

Connectivity revenue is: $D = (1 - a - b)R$,

Single switch revenue is: $xC_1 = \frac{x(S - R)}{x + y + z}$,

Area revenue is: $yC_2 = y\left[\frac{S - R}{x + y + z} + \frac{aR + T_c}{y + z}\right]$,

Overseas revenue is: $zC_3 = z\left[\frac{S - R}{x + y + z} + \frac{aR + T_c}{x + y} + \frac{bR + T_{os}}{z}\right]$,